ELECTRICAL REVIEW

Vol. CXLVI 21st APRIL 1950 No. 3778

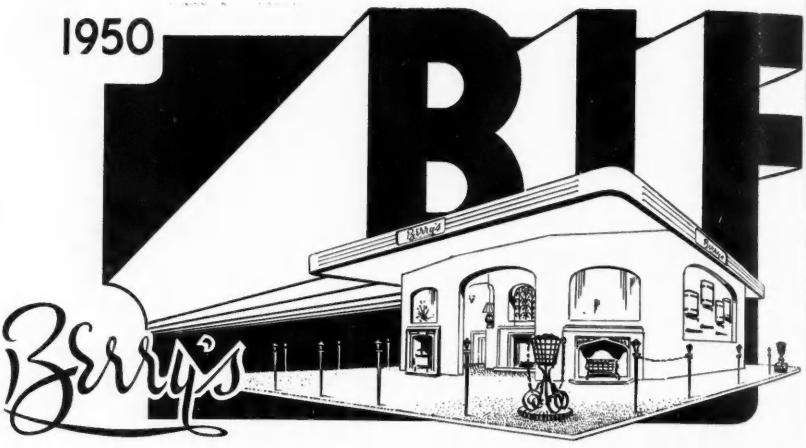
Managing Editor: HUGH S. POCOCK, M.I.E.E. *Technical Editor:* W. O. FENWICK, M.I.E.E.
Industrial Editor: J. H. COSENS *Technical Consultant:* C. O. BRETTELLE, M.I.E.E.

IN THIS ISSUE

Efficient and Expanding	739
Power from Peat	741
Electrical Manufacture in 1949	745
Views on the News	749
New Books	750
Fruit Grading and Storage	751
Electrical Machine Analysis	754
Recent Introductions	755
Earthing Mobile Plant	759
Universal Decimal Classification. *By Major E. H. W. Banner, M.Sc., M.I.E.E., F. Inst.P.*	760
Brazilian Electrical Policy	763
French Coalfield Plant	765
Personal and Social	767
Next Week's Events	770
Radio Components Exhibition	775
Electrodepositors' Conference	779
Cooker Hire-Purchase	781
Classified Advertisements	67
Index to Advertisers	84

EDITORIAL, ADVERTISING & PUBLISHING OFFICES: Dorset House, Stamford St., London, S.E.1. Telegraphic Address: "Elecrev, Sedist, London." Code: ABC. Telephone No.: Waterloo 3333 (60 lines). Entered as Second Class Matter at the New York, U.S.A., Post Office. Annual Subscription: Home and Overseas £3 6s. 0d.; U.S.A. and Canada $11.00. Cheques & P.Os. (on Chief Office, London) payable to ELECTRICAL REVIEW PUBLICATIONS LTD. and crossed "Lloyds Bank."

1950 BIF



We shall be delighted to welcome our Trade friends to Stand C.507/406 on the main avenue. This new site, occupying twice the space of last year's stand, will help us to do justice to our greatly increased range of Magicoal Fires and Lighting Fittings.

C507/406
Castle Bromwich

FUEL SAVING— FOR THE STEAM-RAISER

May we send
Leaflet 751-X ?

This portable outfit checks the efficiency of steam-raising by measuring the CO_2 percentage and the temperature in the flue gases, enabling the heat lost up the chimney to be determined. Steps can then be taken to reduce wastage and secure maximum efficiency.

CAMBRIDGE INSTRUMENT COMPANY LTD
13, GROSVENOR PLACE, LONDON, S.W.1
SEE OUR STAND, D758, BRITISH INDUSTRIES FAIR, BIRMINGHAM.

ELECTRICAL REVIEW

Vol. CXLVI No. 3778 21ST APRIL, 1950

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872

Efficient and Expanding

ELECTRICAL MANUFACTURERS' SUCCESSFUL YEAR

IN general the report of the British Electrical and Allied Manufacturers' Association for 1949-50 is a record of continued progress achieved by enterprising activity in a great many directions. The period was not without difficulties—old and new—but upon the whole there was an improvement in the conditions in which the electrical industry operated, so far as production was concerned.

More and Better Steel

The situation with regard to materials was easier, especially in the supply of steel which is said to have so closely followed demand that the necessity for the allocation system seems to have disappeared. It is satisfactory to learn that there is an early prospect of new and better grades of low-loss steel, the want of which has handicapped our transformer makers in competition with American producers.

Justifiably, the Association is at pains to make it clear that the power shortage is not a shortage of generating plant. It stresses the fact that its power-plant members are not only keeping ahead of the British Electricity Authority's demands but are also exporting ever-increasing quantities. It is to be hoped that now the B.E.A. has taken over the "phasing" and "progressing" of power station construction there will be no necessity for the storage of turbo-generators until their accommodation is ready. Another hope is that the Government will heed the Association's advice not to indulge in cuts in the power station programme.

While the "heavy" sections of the industry have been doing well, there is apprehension in some of the lighter branches, particularly the production of domestic appliances. The report refers, as we have done, to the position of the cooker manufacturers. Although this is a reflection of the power shortage, there is no doubt that caution has gone too far and that productive capacity is being seriously under-employed. The Electricity Boards have come to a realization that they are rapidly losing the valuable cooking load to the gas industry and are taking steps to deal with it.

Progress in respect of other domestic appliances is retarded by the vicious purchase tax. If the Government expects the industry to export this class of equipment it must not destroy the home market on which export trade is necessarily based.

Cultivating Canada

In the matter of export trade the Association is taking vigorous action to cultivate the Canadian market and encourage its members to meet the requirements of what are, after all, very willing buyers. The B.E.A.M.A. is continuing to strive for the removal of import restrictions, which are making trade with many countries increasingly difficult.

The British electrical industry is the third largest exporter and in spite of the change-over from a sellers' to a buyers' market which has been proceeding for a year or more, it continues to increase its trade. Last year the value of its exports was over six times the pre-war value.

The increase in heavy plant exports has been proportionately greater than the expansion of the trade in "goods and apparatus." Export of heavy plant will continue, though possibly at a lower rate as foreign competition increases, but the industry must also look to the sale of other equipment to maintain its progress. We are certain that the industry will continue to go ahead at home and abroad if it is encouraged, or at least not hampered, by the policy of our own and overseas Governments.

"ELECTRICAL WHO'S WHO"

After some printing delay we are now able to announce that our "Electrical Who's Who" will be published next week. We believe this to be the first directory of its kind. It comprises brief biographies of about 2,600 men and women in all branches of the electrical profession, industry and trade. Among them are included the principal consultants; electricity supply officials; the chairmen, directors and leading members of manufacturing companies; electrical engineers in Government Departments; electrical contractors and wholesalers, etc. The 204-page volume is priced at 12s 6d (plus 6d postage) and is obtainable from the *Electrical Review*, Dorset House, London, S.E.1, or booksellers.

ENGINEERS' STRIKE BALLOT

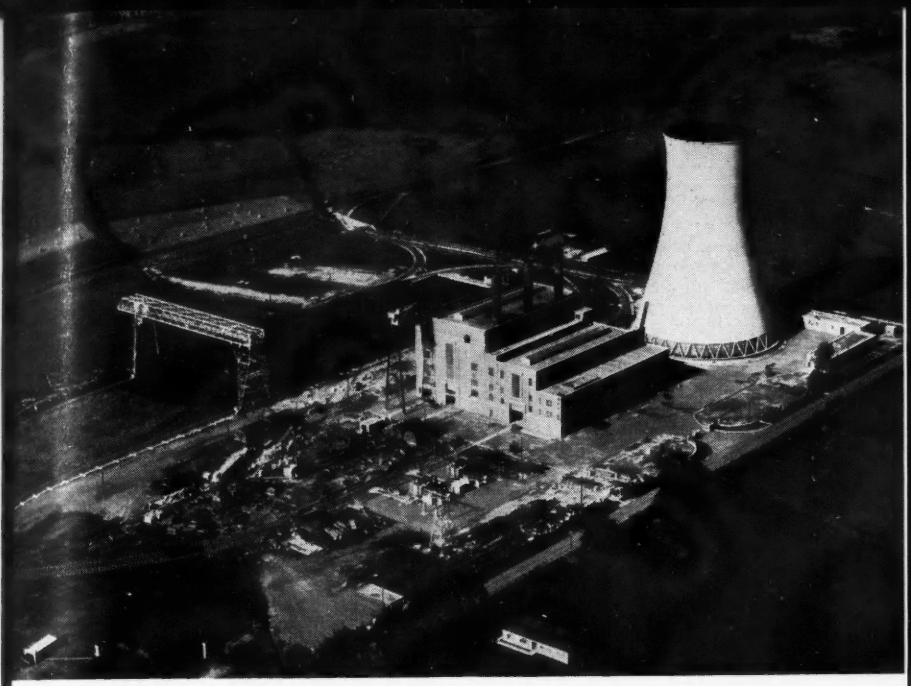
In spite of the advice of the Minister of Labour, the Confederation of Shipbuilding and Engineering Unions has instructed the affiliated unions to go ahead with the ballot of their members. This asks the members to say whether they are in favour of striking to enforce the unions' claim for £1 a week increase in wages or whether the unions shall refer the claim to the National Arbitration Tribunal. The latter alternative is superfluous as references to the Tribunal are made by the Minister of Labour when he is notified of the existence of a dispute and discussions between the parties and the Ministry have failed to produce a settlement. Not all of the union councils favour the ballot, but they have been overborne by the Amalgamated Engineering Union, which is the largest in the Confederation. The employers have refused to negotiate further unless the strike threat is withdrawn and so presumably a state of unsettlement will persist until July.

CONVENTION EXHIBITION

For many years a popular feature of the I.M.E.A. Conventions was the electrical exhibition arranged by the Electrical Development Association. Now that the I.M.E.A. has disappeared the tradition is being maintained by the organizers of the British Electrical Power Convention. If it was considered worth while to continue the exhibition it is equally worth while to ensure its success. Last year, at Torquay, conditions were not ideal and attendance was poor and as a result exhibitors were very disappointed. Many of them feel that something should be done about it. Although the exhibition is designed as much for the public as for Convention delegates it is considered that more purely "delegate" time should be allotted; it is not easy to discuss apparatus with the public milling around. We commend the idea to the Organizing Committee.

ELECTRICAL CONTRACTING

One of the "classics" in the field of electrical contracting is the book by R. H. Taunton, published in 1933, which has now been out of print for some time. Believing that something on these lines would be useful to readers who have joined the industry in recent years, or who contemplate becoming electrical contractors, we have commissioned Mr. Taunton to contribute a series of articles. These will follow the plan of the book and will bring the matter up to date in the light of the changes which have occurred since it was published. The articles will cover exhaustively the organization of an electrical contracting business—finance, estimating, costing, stores and labour being some of the aspects to be dealt with. It is proposed to publish the first of the series in next week's issue.



Power from Peat

Portarlington (Ireland) Station Inaugurated

ON Monday last the Minister for Industry and Commerce of the Irish Republic (Mr. Daniel T. Morrissey) inaugurated the Portarlington peat-fired power station erected by the Electricity Supply Board. The new station is close to Clonsast bog, which is about 4,000 acres in extent and situated four miles north of Portarlington. It has been equipped by the Turf Board with turf-winning machinery capable of producing 120,000 tons of fuel in an average year, all of which will be consumed in the power station.

The Portarlington station is the first turf-fired electricity generating station to be erected in Ireland; it has been designed by the engineering staff of the Electricity Supply Board and has been equipped with two 12,500 kW steam turbo-generator sets which, on the basis of a consumption of 120,000 tons of turf, can produce 90 million kWh a year.

The station is erected on the north bank of the River Barrow, about a quarter of a mile from the town of Portarlington, on a site comprising thirty acres. The boiler plant, the steam turbo-generators, the control room and the general offices for the operating staff are in the main building, to the right of which rises a 236ft high hyperbolic concrete cooling tower.

Behind the power house, and spanned

An aerial view of the Portarlington peat-fired power station which was inaugurated on Monday

by a bridge crane, is the fuel store, capable of holding 40,000 tons of turf. A single-track narrow-gauge railway circling the fuel store, and passing between it and the main building, connects the station with the Clonsast bog and, in addition, a full gauge siding connects the station to the Portarlington-Athlone branch line.

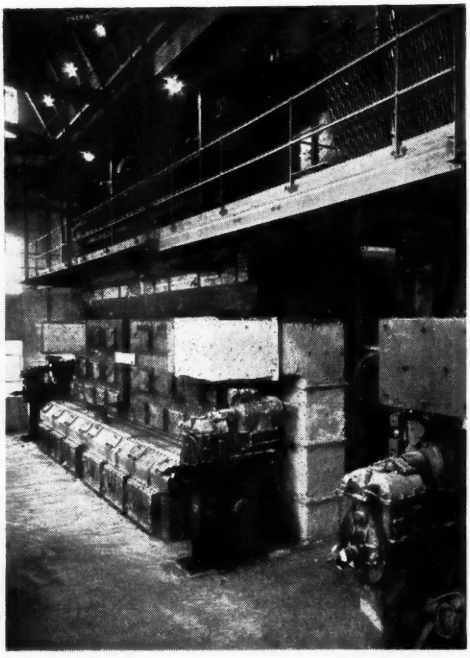
To the left of the power house is an outdoor transformer station. A pump house erected beside the river provides "make-up" water for the 750,000 gallon reservoir in the base of the cooling tower.

The turf, which is machine-won and air dried, is delivered directly from the bog to the station in steel trucks, each holding five tons. On arrival the turf is weighed and samples are taken for analysis and determination of moisture content. It is then fed directly to the boiler-house bunkers or taken to the fuel compound for future use. In the latter case, the contents of the trucks are unloaded in any part of the 12,500 sq yd storage area by means of an 8 ton electric bridge crane. This crane lifts each truck off its bogie, carries it to the required area, tilts the truck to allow a hinged door at the end to open automatically and thus discharges the turf. The truck is then returned to its bogie.

If the fuel is required for the boiler-house bunkers, the turf trucks are run directly to the boiler house and unloaded in a similar manner by two jib cranes on the roof of the boiler house. The turf is discharged into one of the three bunkers which serve the three boilers immediately under them. Sixty loads of turf are required to fill a bunker, each of which has a capacity of 300 tons.

Each of the steel bunkers in which the turf fuel is stored converges at the bottom to a vertical drying shaft which guides the turf down to the combustion chamber of the furnace. As the turf descends through the shaft, hot air is blown through it to reduce further the moisture content. When the turf enters the combustion chamber of the furnace, it passes on to a slowly moving chain grate stoker. The residual ash falls from the grate at the back of the chamber where it is collected in hoppers. The ash, which is in the form of clinkers similar to those resulting from coal-burning, is then crushed and removed mechanically to an ash disposal plant which cools the hot ashes and discharges them into wagons for removal from the station.

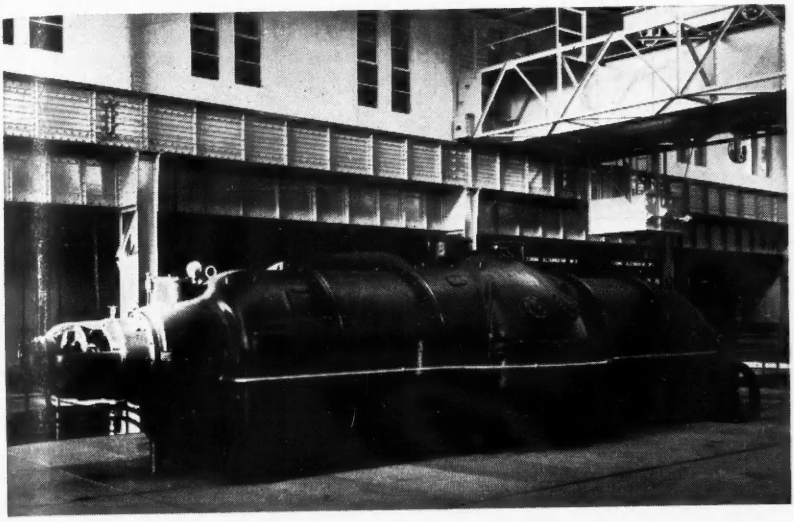
Front of boiler unit showing the turf drying shaft



The steam is delivered at a temperature of 825 deg F and at a pressure of 425 lb/sq in, to the turbine. Each of the three boilers can provide 150,000 lb of steam per hour. The output of one boiler corresponds to the output of one turbo-generator set which, at maximum, is 15,600 kW.

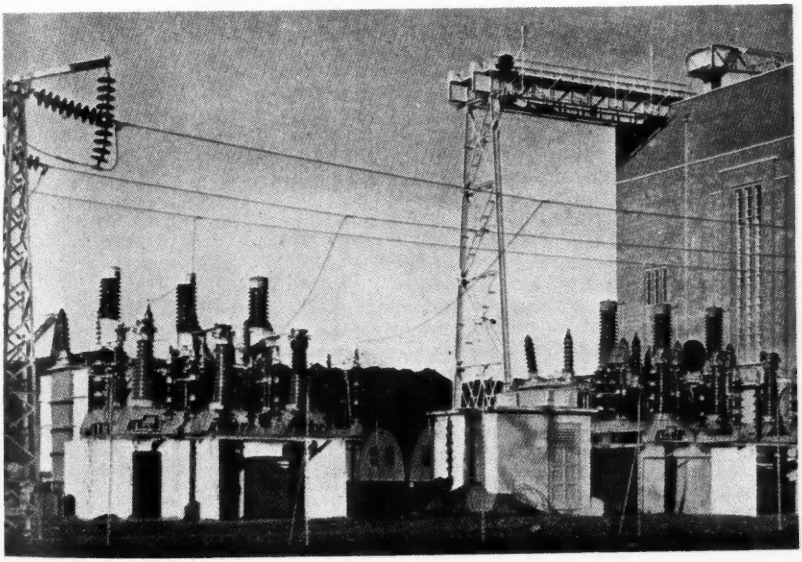
Each of the two 3,000 r.p.m. turbo-generators has an output of 12,500 kW (m.c.r.) at 0.8 power factor; generation is at 10 kV. The c.w. inlet temperature is 75 deg F and vacuum at m.c.r. is 28.5in Hg; the cooling water supply is 12,500 g.p.m.

The cooling tower deals with about 18 million gallons per day.



One of the 3,000 r.p.m. 12,500 kW (0.8 power factor) turbo-alternators at the Portarlington station

Outdoor transformer and switchgear compound with two 20,000 kVA 10/110 kV transformers



About one per cent of the water circulated through the tower is lost by evaporation and this is replaced by water pumped from the River Barrow. A pump house has been erected on the bank of the river for this purpose.

The output of the generators is taken through circuit-breakers to the 10 kV busbars in the main building and with the exception of a comparatively small proportion, which is taken from the busbars through two 2,000 kVA step-down transformers for the purpose of driving motors and supplying lighting and heating throughout the station, the power is conducted by underground cables to the outdoor transformer and switchgear compound.

This compound contains two 20,000 kVA transformers which raise the voltage from 10 kV to 110 kV. The output from the transformers is fed through circuit-breakers to the main transmission line. This line is twelve miles long and connects Portarlington with the main transmission system at Portlaoighise.

The control room is situated in the main building, above the l.v. and 10 kV switchgear. The 10 kV and 110 kV switchgear and transformers are remotely controlled from here. The control room operator can establish direct contact with the Board's other main stations by means of a high-frequency telephone system which operates over the main 110 kV transmission lines.

In the chemical laboratory the moisture content and the calorific value of the fuel used are determined and on these results the price to be paid for the turf is based. The laboratory staff is also responsible for the control and treatment of the feed and boiler water, etc.

It is estimated that the total capital cost of the station when completed will be £1,280,000, or £51.2 per kW installed. Turf consumption per kWh generated is put at 3.0 lb, which at the present price of turf (30 per cent moisture), 39s 6d a ton, gives a fuel cost of 0.635d per kWh. Interest, depreciation, maintenance and repairs, etc., will amount to 0.393d per kWh, making the total production cost 1.028d per kWh.

Two other turf-fired stations are to be erected by the Board—one at Allenwood (Co. Kildare) and the other at Ferbane (Co. Offaly); both will have a capacity of 40,000 kW. There are also to be two new coal-fired plants at Ringsend, Dublin (60,000 kW), and Marina, Cork (30,000 kW).

The main contractors for the Portarlington station were Babcock & Wilcox, Ltd. (boiler plant); ASEA Electric, Ltd. (turbo-alternator sets, transformers and switchgear); Chapman & Co., Belfast (structural steelwork); Irish Engineering & Harbour Construction Co., Dublin (buildings and cooling tower); Sir Wm. Arrol, Ltd. (engine room crane); and Oerlikon, Ltd. (boiler house cranes).

The Budget

Alterations in Taxes

ALTHOUGH in his Budget speech on Tuesday the Chancellor of the Exchequer was able to report an improvement in the country's economic position, he said that there was still need for caution, and he was unable to announce any radical alterations in taxation.

As a relief to lower-paid workers, he proposed to reduce the rates of tax on the first £250 of earned income. He intended to subject to surtax, as from the beginning of the last financial year, sums paid to high executives of commercial companies as a consideration for their undertaking not to join competitive concerns.

Purchase tax on higher-priced cars would be reduced, but new commercial vehicles would be subject to a 33⅓ per cent tax. It was also proposed to increase the tax on petrol and fuel oil by 9d a gallon as from 18th April.

In the course of his speech, Sir Stafford Cripps mentioned that there would be a measure of relief from income tax for industrial research associations, and that the mills, factories, etc., allowances under the Income Tax Act, 1945, would be continued for a further five years.

The revenue for 1950-51 was put at £3,898,000,000 and expenditure at £3,455,000,000, leaving a surplus of £443,000,000.

A notice issued by the Commissioners of Customs and Excise (No. 78P) states that tramcars, trolley vehicles and other vehicles constructed to carry not fewer than 12 passengers will be excepted from the 33⅓ per cent purchase tax. Mobile cinemas, canteens and workshops, tower wagons, refuse collecting and similar vehicles in which passenger and goods accommodation is only incidental to the use of the vehicles for other purposes will also be exempt.

Electrical Manufacture in 1949

Points from the B.E.A.M.A. Report

DURING the year ended 30th September last membership of the British Electrical and Allied Manufacturers' Association rose by nineteen to a total of 368. The report for the year surveys the Association's manifold activities in some detail.

Referring to the economic situation the report says that after considering suggestions made by the Federation of British Industries the members were asked to support, at least for the present, the policy of voluntary dividend limitation, on the understanding that this would be accompanied by restraint in respect of wage claims by the Trades Union Council. After devaluation members were asked to continue their endeavours to stabilize prices, at the same time taking full advantage of devaluation in developing the overseas markets, particularly in "hard currency" areas.

Electricity Supply Relations

Through the Joint Committee with the British Electricity Authority and Area Boards close liaison has been maintained with the electricity supply industry. Sub-committees have been set up to deal with general conditions of contract; the standardization of transformers, switchgear, turbo-alternators and meters; appliances and installation equipment; price adjustment clauses and formulæ; discounts on electric motor purchases; and quantity buying terms and discounts. Three additional sub-committees have been formed to discuss the prices of generating plant, transformers and switchgear.

The long-term nature of the wide variety of subjects dealt with does not permit a review of the sub-committees' activities but as an example of what is being done it is mentioned that an agreed draft of a set of conditions to govern contracts including erection has been accepted by the main Committee.

The output of turbo-generating plant in 1949 was over 1,900 MW (against 1,100 MW in 1948). But the actual amount of plant commissioned was about 825 MW The remainder was either being commissioned, erected, awaiting readiness of power stations or being exported. The manufacturers claim that there is no "shortage of power plant"; they can meet the B.E.A.'s requirements in full and maintain and expand the export market.

Turbo-generator plant manufacturers were set a target of 1,600 MW for 1949 by the Heavy Electrical Plant Committee but, as already stated, member-firms of the Association delivered over 1,900 MW from their works and they had undertaken to produce the 1,500 MW planned for the B.E.A. in 1950 as well as meeting export requirements. The B.E.A.M.A. representatives on the Committee have repeatedly emphasized that the power-station construction programme is insufficient to meet the growing demand, let alone overtake arrears.

Reference is made to the Co-ordination Committee which co-ordinates and "progresses" all main power station contracts. The Committee, which includes representatives of manufacturers, has been taken over from the Ministry of Supply by the B.E.A.

B.E.A.M.A. Catalogue

Ten thousand copies of the first edition of the B.E.A.M.A. Catalogue have been distributed to all parts of the world and 2,000 to important individuals, firms and authorities in this country. The Catalogue has been well received and an improved edition is in course of preparation.

B.E.A.M.A. had 160 representatives at the first British Electrical Power Convention last June; this year there will be 200. It is considered that the spirit of co-operation between all interests was of great value to the electrical industry and this year's Convention, under the presidency of Sir Vincent de Ferranti, is

eagerly anticipated on all sides. An Exhibition Sub-Committee has been set up, representing the organizers (E.D.A.), the B.E.A.M.A. and the B.E.A.

In July next upwards of 2,000 delegates from over 40 countries will gather in London for the fourth plenary meeting of the World Power Conference at which the theme will be "World Energy Resources and the Production of Power." It is recalled that the inception of the Conference was due to the Association and its Council of that time.

A report is expected shortly from an industrial mission which visited Pakistan earlier this year upon which the Association was represented by Mr. E. C. Holroyde (vice-president) and a member of the Council.

Standardization of Products

In a reference to the report of the Lemon Committee on the standardization of engineering products, the report stresses the leading part which the Association has taken in this matter. The aim has been to reduce the variety of ratings, types and designs without crystallation of design. This flexibility has enabled British manufacturers to meet the diverse demands of the home and export markets with the minimum number of types and sizes and, at the same time, to keep their designs up-to-date by research and development. As auxiliary to the work of the B.S.I. the Association has established joint committees with large users, including the B.E.A. and Area Boards, the Railway Executive and the National Coal Board.

A B.E.A.M.A. team representing the switchgear and the motor starting and control gear sections of the industry visited the United States towards the end of the year under the auspices of the Anglo-American Council on Productivity and a report is expected shortly. There was also a B.E.A.M.A. representative in the team which studied packaging in the United States. The Association's Standardization Committee is studying the report of the special team on simplification in industry which visited the United States.

Over 1,300 expert representatives of member firms serve on over 400 committees of the British Standards Institution, a contribution which is larger than that of any single industry. The Association has collaborated in the B.S.I.'s work in fostering the use of British standards in overseas countries, of which Argentina is a recent example. B.E.A.M.A. representatives have also been active on various committees of the International Electrotechnical Commission.

Industrial panels, corresponding to the 30 B.E.A.M.A. Sections, have been set up for consultation by the Festival of Britain authorities. The Association is doing everything possible to ensure that electrical products are adequately and properly represented in the Festival.

The Council has agreed to create a B.E.A.M.A. fund to provide a substantial part of the sum necessary for the endowment of two Chairs in the Department of Engineering, Cambridge University (Electrical Engineering and Heat Engines) and members have been asked for their support. The appeal has already met with an enthusiastic response from some member firms.

Among other bodies with which the Association is associated are the Engineering Advisory Council (of which Sir Harry Railing is a member), the B.E.A.M.A.-B.E.A.-S.B.A.C. Joint Committee, the Federation of British Industries, the I.E.E., the E.D.A.-B.S.I. Advisory Committee on Electrical Appliances and Accessories and the B.I.F. Electrical Exhibitors' Committee.

After representations had been made by the Council, in conjunction with the Electrical Fair Trading Council, practically all electrical consumer goods were released from the operation of the Price Control Order (S.I. 1948, No. 2760).

During the year the Association's Monopolies Committee secured the opinion of counsel that they did not think that B.E.A.M.A.'s activities would, in general, be adversely criticized by the Monopolies Commission.

The Canadian Market

Much of the section of the report dealing with export trade is concerned with Canada to which the Association has devoted a great deal of attention. The report of the Gilpin Mission to Canada was published in January last year and this was followed in March by a separate

report upon electrical market potentialities by the Association's export director, Mr. D. M. Buist, who was a member of the Mission.

Results that have flowed from the visit are said to have become evident during the past year; one being the successful plans for overcoming testing and approval difficulties in Canada. Preliminary talks during the visit led to the organization by the B.S.I. of an Electrical Exports Standards Mission which was headed by Mr. Buist. This Mission was successful in arranging with the Canadian Standards Association for the establishment of a preliminary approvals scheme in the United Kingdom.

Referring again to the B.E.A.M.A. Catalogue, the report says that 1,200 copies were distributed in Canada and it was enthusiastically received. Arrangements have been made to supply editorial information to the Canadian trade and technical Press and member firms are intensifying their advertising efforts in this field. The Export Panel and the Education Committee are examining ways and means of increasing the number of students in United Kingdom engineering workshops and encouraging visits by engineering lecturers from Canadian universities and technical colleges. Sir Arthur Fleming, chairman of the Education Committee, is visiting Canada in this connection.

Expansion of Exports

The electrical industry now contributes the third largest volume to Britain's export trade. In 1949 the total value of electrical exports was £140 million (over six times the 1938 figure), 62 per cent being goods and apparatus and 38 per cent machinery. Anticipated difficulties in the year ahead are competition from Germany and Japan, tariffs, exchange quotas and import licensing restrictions. But, it is said, notwithstanding any difficulties, the British electrical manufacturing industry is determined to secure its share of world trade.

It is pointed out that B.E.A.M.A. member firms have consistently exceeded the export quotas set for them, largely by reason of greater machinery exports. For 1950 the machinery quota has been raised by £4 million a month while the quota of goods and apparatus has been decreased by £1.4 million a month.

After references to the effect of devaluation on export trade and to a visit of Austrian engineers to this country, it is stated that a certain amount of competition from Germany is to be expected but that electrical manufacturers are prepared to deal with this provided it is fair.

Japanese Undercutting

As regards Japan, the hope that the Supreme Command would not permit manufacturers to seriously undercut British prices in world markets had not been fulfilled. Examples of "fantastic" price-cutting are being reported and B.E.A.M.A. is making representations for a stricter control over Japanese exports by the Supreme Command.

It is hoped to overcome difficulties in connection with the establishment of an Overseas Centre in Pakistan and discussions are proceeding for the formation of an Overseas Centre in the Middle East. During the year an Argentine Overseas Centre was formed in Buenos Aires.

The Export Department has dealt with over 300 requests for electrical agencies and over 500 inquiries for names of electrical manufacturers. Cases were prepared and submitted against applications for tariff protection by South African makers of low-voltage switch and fuse-gear and by Indian manufacturers of brass lampholders.

The rest of the export section deals with the General Agreement on Tariffs and Trade, overseas import restrictions, attempts to liberalize world trade and bilateral trade agreements.

The activities of various Council Committees are reviewed in the third section of the report. Among the subjects mentioned are the conclusion of an agreement with the B.E.A. and Area Boards on model general conditions of contract; a further delay in the negotiation of contract conditions with the Soviet Trade Delegation; the evolving of a plan, in conjunction with the F.B.I., for providing training in members' works for overseas post-graduate students. The Materials Committee has continued to co-operate with producer associations. The general run of steel is now being produced in quantities so nearly approaching demand that the Committee is supporting the proposal that the allocation scheme should be

abandoned, with the possible exception of sheet steel. Increased quantities of better grade hot-rolled electrical sheet are now available and the sheet makers are installing special plant for the production, as soon as possible, of new and better grades of low-loss steel which will enable further progress to be made, particularly in the efficiency of transformers.

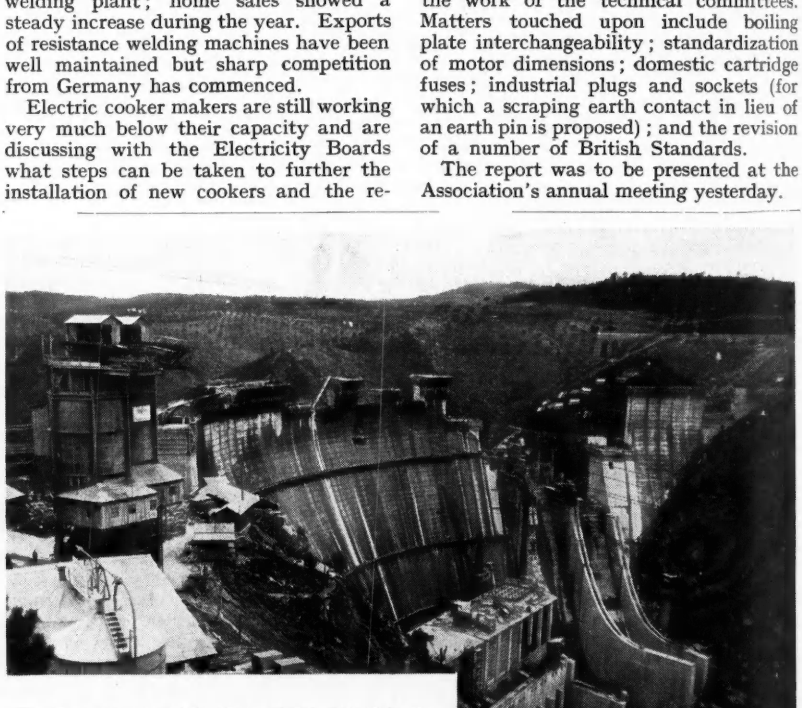
In the section devoted to the work of the Sections it is mentioned that as a result of the work of the Arc Welding Electrode Section adequate supplies of electrodes are now available but only by using special core steel at a higher cost. The Ministry of Supply is being pressed for greater supplies of normal steel. The overcoming of the electrode shortage is expected to result in greater exports of welding plant; home sales showed a steady increase during the year. Exports of resistance welding machines have been well maintained but sharp competition from Germany has commenced.

Electric cooker makers are still working very much below their capacity and are discussing with the Electricity Boards what steps can be taken to further the installation of new cookers and the replacement of old ones. Mention is made of the onerous purchase tax on domestic electrical appliances which is seen to be due to the shortage of electricity. It is hoped that collaboration with the International Commission on Rules for the Approval of Electrical Equipment will bring into closer alignment the regulations in use in European countries with those in force in the United Kingdom.

Restrictions on supplies of materials have hindered the activities of makers of heavy-duty cooking equipment but there are hopes of more consideration from the Ministry of Supply. Other shortages referred to are in meter jewels, insulating material and porcelain bushings for switchgear.

The next section of the report reviews the work of the technical committees. Matters touched upon include boiling plate interchangeability; standardization of motor dimensions; domestic cartridge fuses; industrial plugs and sockets (for which a scraping earth contact in lieu of an earth pin is proposed); and the revision of a number of British Standards.

The report was to be presented at the Association's annual meeting yesterday.



The Zezere Dam, which is being built at Castelo do Bode, about 90 miles north of Lisbon, in connection with a hydro-electric scheme. The electrical equipment is being supplied jointly by the English Electric Co. and Metropolitan-Vickers. The generating plant for the project will comprise three vertical shaft reaction turbines coupled to 57,400 kVA generators

VIEWS on the NEWS

By REFLECTOR

UPON the whole the electrical industry is very doubtful of its chances in the American market. The carriage of coal to Newcastle is believed to be a more lucrative business than trying to sell electrical equipment in a country with a strong, efficient and comprehensive electrical industry of its own. But the American automobile industry is the greatest in the world and yet British motor car makers have already done well in the United States and, encouraged by Mr. Hoffman, the Marshall Aid Administrator, are sanguine enough to think that they can do even better. Does this not suggest that some of our electrical manufacturers might have another look round before regarding the American market as hopeless?

★ ★ ★

Without belittling the problem I may say that complainants of the emission of dust and moisture from power stations are not only prone to exaggerate but encourage others to see things which they had not noticed before. Another point is that the British Electricity Authority is blamed for emissions (which is quite in order) but it is not admitted, even if it is realized, that the nuisance often existed long before nationalization.

★ ★ ★

Correspondence upon the incidence of meter reading has been appearing in the *Manchester Guardian*. It arises out of the Clow surcharge-rebate system. Some readers have complained that while there was delay in reading their meters for the surcharge period, there had been almost indecent haste to get the job done for the ensuing rebate quarter. Sharp practice by Electricity Boards has been suggested by some, but others have come to the Boards' rescue. One writer who had experienced this overlap wrote to the Board and was credited with the amount which appeared to have been overpaid. Another correspondent said that he and some of his neighbours had actually benefited from a reverse operation—curtailed surcharge period and lengthened rebate period. It all goes to show that the system was extremely troublesome and not really practicable, but its echoes are a long time dying out.

★ ★ ★

Although objections are still being published to the Southern Electricity Board's inquiries at consumers' premises, in preparation for the introduction of a standard tariff based on the number of rooms, there are occasional notes of approval in the Area newspapers. One of these appeared in a recent issue of the *Western Gazette* (Yeovil). The writer said: "The official was only in the house just over five minutes and did his job in a manner no-one could take exception to. I had no need to fill in a form or waste time and money in writing a letter, and in my opinion the method of collecting the information is much more economical than asking consumers to fill up and return forms." The writer also considers the proposed basis much better for the consumer than the floor area method which was formerly used in his district.

★ ★ ★

Further arguments in the earth or insulate controversy appear to arise as a result of a report from Sydney of a girl who received an electric shock every time her boy-friend kissed her goodnight. The report states that it was discovered that the man was leaning against a faulty light switch: he was wearing rubber soles, but the girl had on leather shoes and was standing on a wet path. We fail to see quite why the man, as a link in the circuit, did not participate in the electric shock. Can it be regarded as certain that the sensation of "tingling all over" described by the girl was really electrical?

NEW BOOKS

Photo-electricity and Its Application.—By V. K. Zworykin and E. G. Ramberg. Pp. 494; figs. and index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 60s in U.K.

Photo-electric devices are at present being used on an increasing scale in industry and in view of the comparative dearth of books on the subject the present work is welcome. The two American authors survey the field of photo-electric effects, their history, theory of operation and application, the primary emphasis being placed upon practical aspects. The treatment is mainly descriptive with mathematical formulæ included in footnotes for the sake of clarity.

The book is divided into two equal parts, the first dealing with theoretical principles and the construction of light-sensitive elements, while the second is concerned with applications. The theory of photo-electricity is not treated at all well and although in a book covering such a wide field something must suffer this should not be it. However, the section on applications is excellent and describes such a diversity of individual equipments and circuit arrangements for industrial and experimental purposes that the book will undoubtedly be of great value to both actual and potential users of such apparatus. The volume is well illustrated and produced, but owing to the Anglo-American exchange rate the price is rather high.—R. P.

Electrical Measurements. By D. Karo. Pp. 191; figs. 106. Macdonald & Co. (Publishers), Ltd., 19, Ludgate Hill, London, E.C.4. Price 18s.

Counting and measurement are essentially different in character. The result of counting is either absolutely correct or it is wrong; the result of a measurement is never correct and the statement of this result is practically useful only if the maximum possible error is known with reasonable certainty. Those engaged in electrical measurements must, therefore, not only understand the methods they use and how to eliminate the sources of error, but also how to assess the magnitude of such residual errors as are unavoidable.

Conventional textbooks on electrical measurements lay greatest stress on basic techniques, and tend to deal with errors merely incidentally. The author of this book treats errors as of prime importance, and, within the comparatively narrow range of d.c. measurements of resistance, current and e.m.f., he deals exhaustively with the various methods available, investigating the possibilities of errors and their possible magnitudes in detail, showing how these criteria determine the method preferable for stipulated conditions. The reader will find in this book penetrating investigations of the theory of the various bridge circuits used for resistance measurements, of d.c. potentiometers, of galvanometers for null and ballistic measurements, and of fluxmeters.

The book can be recommended to students reading for a final degree examination and to practical engineers; nothing quite like it has appeared before and it contains much that is not easily found elsewhere. Notwithstanding the detailed table of contents, an index should have been provided.—G. W. S.

Books Received

Electric Resistance Welding. By H. E. J. Butler. Pp. 173; figs. 91; index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 17s 6d.

Basic Electricity for the Million. By L. Houldridge. Pp. 94; figs. 49. Crampton & Sons, Ltd., Sawston, Cambridge. Price 6s.

"Mechanical World" Electrical Pocket Book. Pp. 357; figs. and index. Emmott & Co., Ltd., 31, King Street, Manchester, 1. Price 3s.

Electric Circuit Theory. By H. Tropper. Pp. 164; figs. 100; index. Longmans, Green & Co., Ltd., 6 & 7, Clifford Street, London, W.1. Price 15s.

Principles of Television Reception. By A. W. Keen. Pp. 319; figs. and index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 30s.

Fruit Grading and Storage

Extensive New Installation at Faversham

SINCE we described in our issue of 2nd September last electrical methods in the storage of apples, a large new electrically operated plant has been opened by East Kent Packers, Ltd., at Faversham, covering the grading of apples and pears in addition to their storage.

Though operating on the same principles as the plants described in our previous article, this new installation, being designed to handle co-operatively the produce of at least fifteen large growers in East Kent, is on a much more extensive scale. The largest storage plant we saw in the Fens district had a capacity of 300 tons: that at Faversham already has a capacity for gas-storing 1,800 tons of fruit.

The packing station stands on a 7-acre site, the grading area occupying 20,000 sq ft of floor space. In its first season, the plant handled 350,000 bushels of fruit and at the busiest period from 3,500 to 4,000 bushels (from 70 to 80 tons) of fruit a day were sorted, graded and sent to market.

The fruit is received from the farms by road in boxes. It the fruit is required for market right away it is tipped out on to conveyor belts where any damaged fruit is removed. Grading machines automatically separate the fruit according to weight and it is then wrapped and packed, further conveyors carrying the filled boxes to the dispatch bay.

Fruit not required immediately goes into store. At present there are eighteen 100-ton refrigerated gas stores, while eight 200-ton single cold rooms for short term storage are being constructed.

The picture at the head of the page shows the automatic grading of fruit according to weight

Doubling of the gas storage capacity is under consideration.

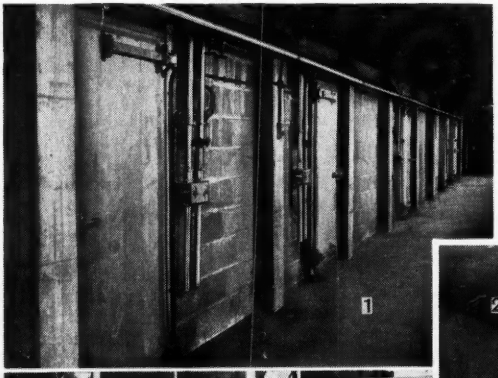
The fruit stores, each of which is 20ft by 30ft by 20ft high, are constructed of reinforced concrete insulated with "Celcan." Access to the stores is by doors at both ground and first floor levels and the cases of fruit are placed on wooden floor mats, air being circulated round them by 30in Keith Blackman fans (3 h.p. 930 r.p.m. motors) in the top of 30in diameter circular ducts erected vertically in the centre of the room. The air is cooled by passing it over brine cooling coils before flowing through the duct and being discharged beneath the ceiling. Arrangements are made for reversal of this flow, if required, the direction of rotation of the fans being regulated by drum-type "Dupar" controllers.

The brine is cooled by two J. & E. Hall 6in by 6in monobloc ammonia compressors each vee-belt driven by a 45 h.p. 1,450 r.p.m. Crompton Parkinson motor. With the aid of thermostats set in accordance with conditions, it is arranged for one or both of the compressors to come into operation as conditions require. The brine is circulated by a Girdlestone centrifugal pump driven by an 11 h.p. 1,440 r.p.m. Brook motor.

Cooling Water Circulation

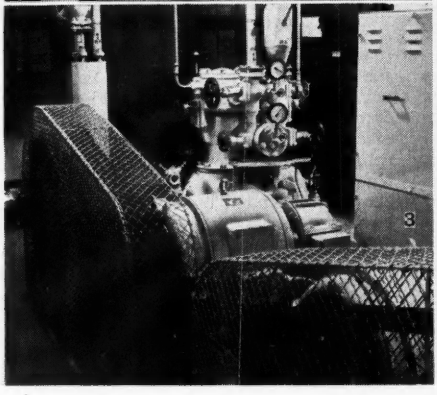
The water for the condensers which cool the ammonia gas to a liquid at about 60 deg F (depending on conditions) is circulated by a similar pump with a 3 h.p. motor, the cooling being assisted by two fans (2.7 h.p. motors). A high pressure cut-out is provided in case the water supply should fail.

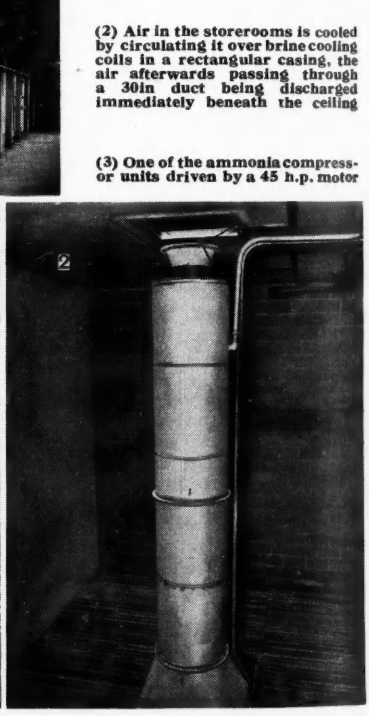
Four scrubbers or CO_2 absorbers are



(1) Entrance to gas store-rooms

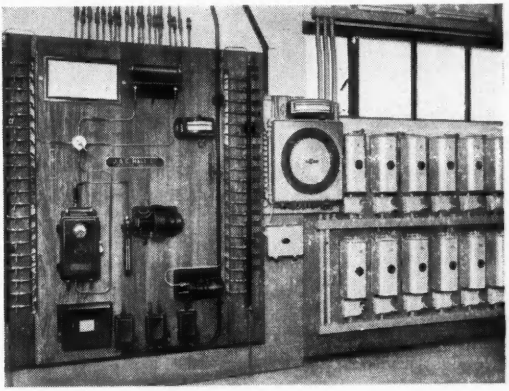
(2) Air in the storerooms is cooled by circulating it over brine cooling coils in a rectangular casing, the air afterwards passing through a 30in duct being discharged immediately beneath the ceiling





(3) One of the ammonia compressor units driven by a 45 h.p. motor

Sampling board, 36-point distance thermometer and fan controllers in compressor room

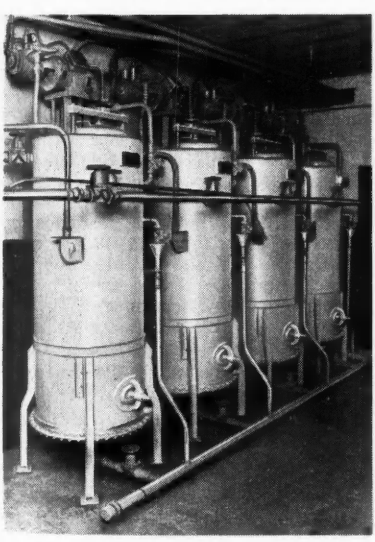


provided. These consist of tanks of caustic soda through which the air from the stores is pumped with the aid of ¾ h.p. Brush induction motors. A further Girdlestone pump driven by a 1 h.p. Brook "Cub" motor is available for pumping caustic soda solution from the mixing tank to the battery of scrubbers.

Storage temperatures required vary from 34 to 40 deg F according to the variety of the fruit. A thirty-six position Elliott distance thermometer mounted in the compressor room gives the temperatures at both top and bottom of each storeroom. Alongside this instrument is a sampling board equipped with a CO_2 indicator, a carbon furnace unit for measuring the oxygen content and a draught gauge. Facilities are provided to prepare for one test while actually doing another.

We thank the East Kent Packers, Ltd., for their permission to inspect the installation, and also J. & E. Hall for supplying certain of the technical information embodied in this article.

Battery of "scrubbers" or CO_2 absorbers



Public Lighting Notes

HYDE Corporation Highways Committee has approved an estimate submitted by the borough surveyor amounting to £9,800 for the installation of sodium lighting in Manchester Road, from the borough boundary to the Market Ground, and in Mottram Road.

TYLDESLEY (Lancashire) Urban District Council proposes to spend £2,000 on sodium street lighting if a licence to do the work can be obtained.

Baston, Langtoft, Greatford and Thurlby have been selected by SOUTH KESTEVEN R.D.C. to have street lighting installed during 1950.

DONCASTER Corporation is recommended to make application to the Ministry of Transport for authority to carry out immediately a scheme for the lighting of the Hexthorpe trolley-bus route at an estimated cost of £1,129.

CARLISLE Public Lighting Committee recommends the acceptance of tenders of the General Electric Co., Ltd., for mercury vapour lighting in London Road (£1,914), and in Newtown Road (£1,730).

A lighting scheme for the trunk road through BRIGG has been approved by the General Purposes Committee of the U.D.C. and will be submitted to Lindsey County Council.

ROSS (HEREFORD) U.D.C. has accepted the principle that the streets of the town should be lit entirely by electricity instead of gas.

Electrical Machine Analysis

Methods Discussed at Imperial College

A TWO-DAY colloquium on electrical machine analysis held in the Electrical Engineering Department of Imperial College, London, recently, was attended by some forty engineers drawn from industry, the universities and technical colleges.

The first session, under the chairmanship of Professor Willis Jackson (Imperial College) was devoted to a review of present-day analytical methods. The discussion was opened by Professor M. G. Say (Heriot-Watt College, Edinburgh), who surveyed the two-axis approach to electrical machines, and Mr. S. Neville (Metropolitan-Vickers Electrical Co.), who made some suggestions concerning the method of obtaining machine parameters from design data. Other speakers emphasized that few parameters are constant for all conditions of operation and that systematic flux-plotting was one way of obtaining them. It was suggested that parameters obtained from the ratios of corresponding increments of field and armature current gave good results in many cases.

Transient Performance

At the second session Mr. B. Adkins (B.T.H. Co.) opened a discussion on the transient performance of synchronous machines, developing a set of equations for their performance by the introduction of equivalent direct currents in coils on the direct and quadrature axes. Professor G. H. Rawcliffe (Bristol University) then referred to the testing techniques available for determining the several reactances required for transient analysis and the difficulty of reconciling their several results. The possibility of setting up equivalent circuits on a.c. network analysers received attention and the value of per-unit notation in generalized problems was stressed.

A dinner held on the first evening was followed by an informal discussion on co-operation between industry and the universities with regard to the advancement of methods of machine analysis. This was opened by Professor Willis Jackson and there was general agreement that it would be desirable for university graduates to obtain some experience in industry before attempting research in electrical engineering, but the provision of facilities for advanced instruction and research was desirable.

Matrix Technique

The use of matrix methods for machine analysis was introduced in the third session by Mr. M. W. Humphrey Davies (Imperial College) after which Mr. W. J. Gibbs (B.T.H. Co.) demonstrated a powerful method for the practical solution of problems concerning the performance of all types of electrical machine, except those with salient poles on both stator and rotor. The method, which was based on the two-reaction concept and used a simplified matrix technique, afforded a ready means of obtaining transient and steady-state solutions in terms of the parameters which had been defined by Mr. Adkins. The use of digital computors for the evaluation of matrices and alternative approaches, using Lagrangian dynamics, were also mentioned.

At the final session of the gathering Mr. L. D. Anscombe (B.T.H. Co.) opened a discussion on the possibilities of a general approach to machine analysis. He recommended a broader academic approach to the machine in undergraduate courses and stressed the desirability of better definitions of the terms used in calculating the performance of electrical machines.

Loughborough College Equipment

APPLICATION to the Minister of Health for sanction to borrow the sum of £10,368 for the provision of new generating plant, accessories and cables at Loughborough College is recommended by the Leicestershire County Finance Committee.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Rust and Corrosion Remover

TO meet the demand for a general purpose and economical rust removing material, the PYRENE CO., LTD., Great West Road, Brentford, Middlesex, has introduced "Preperite," which although primarily intended for the removal of rust can also be used to remove corrosion products from aluminium and aluminium alloys. Available in minimum packings of 7 gall. carboys, this material is flexible in application and can either be brushed on or made up for the treatment of metal parts by immersion in a tank.

Automatic Domestic Dishwasher

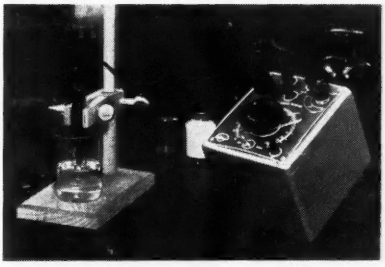
A domestic dishwashing machine brought out by W. H. PAUL, LTD., Breaston, Derby, is fully automatic in operation; it will wash, rinse and dry two dozen plates, a dozen saucers, ten cups and cutlery in ten minutes and then switch itself off.

The machine supplies its own hot water by means of a 4 kW immersion type element in a lagged tank and a pilot light indicates when the desired temperature of 170 deg F has been reached, this taking 12 minutes from cold. A small motor, started by a push-button, drives three discs which, as they revolve operate a series of mercury switches. These in turn open an electrically operated valve to admit 2 gal of hot water to the washing tank, start the pump which operates four sprays rotating at 300 r.p.m., drain, refill, rinse, drain and finally switch off. The pump is driven by a $\frac{1}{2}$ h.p. motor.

The washing tank, fittings, top and lid are all of stainless steel, the body being of $\frac{1}{8}$in aluminium. Overall dimensions of the machine are 3ft high, 1ft 9in deep and 3ft 6in long.

Conductance Bridge

A conductance bridge, type E7566, introduced by MULLARD ELECTRONIC PRODUCTS, LTD., Century House, Shaftesbury Avenue, London, W.C.2, is a convenient and sensitive means of indicating chemical or concentration changes in a wide variety of industrial processes. This instrument is basically a modified Wheatstone bridge which operates at 2.9 kc/s, balance being obtained by a precision potentiometer and



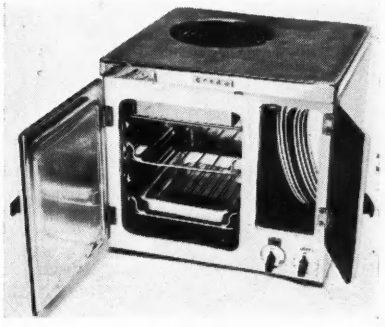
Mullard conductivity bridge in operation

indicated by a "magic eye." The main dial is calibrated in μmhos but an inner scale reads from 1 to 100 parts/million of sodium chloride. This is used with a jacketed conductivity cell containing a standard solution, under which conditions the bridge operates as a comparator. Temperature compensation in such tests can be automatically achieved by immersing the jacketed cell in the test solution.

Table Cooker

An oven space measuring $13\frac{1}{2}$ in by $8\frac{3}{4}$ in by 9 in is provided in the new Creda "Cadet" cooker produced by the SIMPLEX ELECTRIC CO., LTD., Oldbury, Birmingham. The cooker has a bottom element of 350 W and an 800 W top element which also serves

Creda "Cadet" cooker (Simplex Electric)



as a grill; these are thermostatically controlled, the dial type switch being marked in degrees. A pilot light indicates that the thermostat is keeping the oven at the selected temperature.

At the side of the oven is a plate-warming compartment (14½ in by 10¼ in by 5¾ in). The doors of this and the oven have heat resisting catches and the oven door is fully insulated.

The single circular radiant hotplate is controlled by a "Simmerstat." The whole hob lifts off or it can be opened to an angle of 45 deg to give access to the boiling plate drip tray.

Cream vitreous enamel is used as a finish. The overall dimensions are 18¾ in by 16¼ in by 18 in. An instruction book, which also includes recipes, is being supplied with the cooker.

Vibrometer Amplitude Scale

In response to many requests the G.E.C. has produced an amplitude scale for use with its well-known reed vibrometer. This instrument will now be supplied with such a scale without any extra cost and users who purchased one before scales were available will be sent one free of charge on application to M. Dept., the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2.

Portable Fluorescent Units

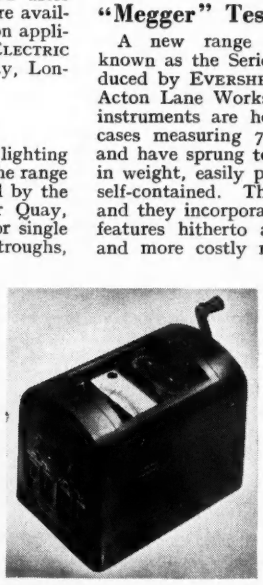
The answer to many industrial lighting problems may well be provided by the range of portable lighting units introduced by the LEIGH ELECTRIC CO., LTD., Lower Quay, Fareham, Hants. Either twin 2ft or single or twin 5ft fluorescent lighting troughs, according to model, are mounted on the outer end of a counterbalanced twin tubular boom. This swivels on a trolley which travels on rails between the twin tubes of the inclined pillar. The whole assembly swivels at the base, which houses the control gear and is fitted with roller bearing castors for ease of movement. The larger models have a maximum lamp height of 12ft at a reach from the base of 4ft while the smaller ones can be raised to 6ft with a reach of 3ft. Alternative models of the appliance can be supplied to suit special requirements.

Plastic Cable and Pipe Clips

With the introduction of non-ferrous installation components such as aluminium conduit and cable sheathing, the prevention of electrolytic corrosion is assuming increasing importance. With this in mind the SYNTHETIC CARBON AND ENGINEERING CO., LTD., Cumberland Road, Stanmore, Middlesex, has introduced a range of plastic cable and pipe clips in various sizes to suit a wide variety of requirements.

"Megger" Testers

A new range of "Megger" testers, known as the Series 4 has just been introduced by EVERSHED AND VIGNOLES, LTD., Acton Lane Works, London, W.4. These instruments are housed in black moulded cases measuring 7.75in by 5in by 5.75in and have sprung terminals. They are small in weight, easily portable, and are entirely self-contained. Their ranges are moderate and they incorporate in a small instrument features hitherto available only in larger and more costly models. The series includes insulation, continuity, earth and earthometer testers.

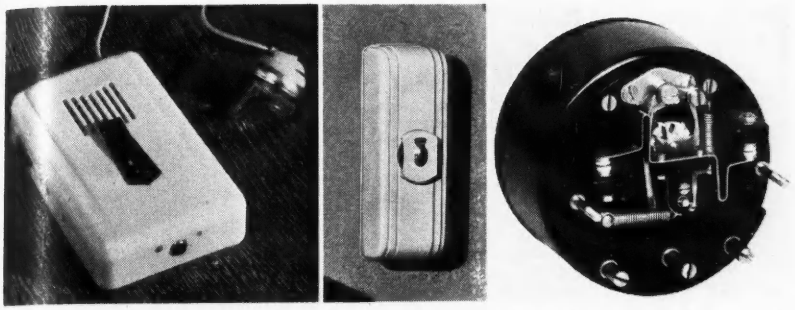


One of the Series 4 "Megger" testers (Evershed & Vignoles)

Left: Portable fluorescent floor standard with swivel base (Leigh Electric Co.)

Hearing Aid

Incorporating a three-valve resistance-capacity coupled amplifier with a separate on-off switch and finger-tip volume control, the 5 oz "Lectron" hearing aid which has just been placed on the market by the LECTRON HEARING AID CO., 116, Victoria Street, London, S.W.1, has recently been approved by the New Zealand Government for inclusion in its health



Left: "Lectron" hearing aid. Centre: H.M.V. room thermostat. Right: "Duplex" time switch

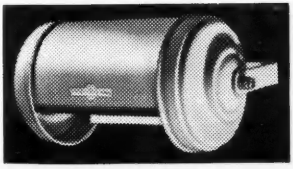
scheme. This unit, which employs a crystal microphone, is housed in an atractive moulded case with a metal spring-loaded back, and black or cream finish.

Room Thermostat

A sensitive room thermostat type RT/1 for use with electric fires or convector heaters has just been made available by E.M.I. Sales and Service, Ltd., Hayes, Middlesex. Housed in an attractive moulded case this H.M.V. product is sensitive to temperature changes of ±1 deg F.

Air Sterilizer

The bactericidal and deodorizing action of ultra-violet radiation is utilized in the "Buvan" air sterilizer introduced by Barber Electrical Services, Ltd., Bournville, Birmingham, 30. Suitable for conditioning the air of an average sized room, the unit, which is designed for a.c. only, incorporates a 12in 50 W quartz mercury vapour tube giving an emission at 2,537 A.U. Operation is completely silent. The unit is 18in long and 8in in diameter, the control gear being contained in a cylindrical box. The price is £16 15s.



"Buvan" ultra-violet air sterilizer

Time Switch

A general purpose time switch incorporating a 15-day spring driven movement is offered by K. Emsley, Ltd., 22, Swaine Street, Bradford, Yorks, under the trade name "Duplex." This unit, which is housed in a compact moulded casing, can be arranged to switch on or off once or twice during 24 hours and it has a switching capacity of 10 A d.c. or 15 A a.c. at up to 250 V.

Flameproof Drilling Machine

Several improvements are embodied in the flameproof portable electric drilling machine for coal and stone which is now being made by Siemens-Schuckert (Great Britain), Ltd., Great West Road, Brentford Middx.

While designed primarily for use on

Siemens - Schuckert portable flameproof drilling machine for use on coal or stone

50 c/s supplies through a static transformer, this machine can also be supplied for 150 c/s operation. It is compact, there being no superfluous spaces; economies in this direction have resulted in a 2 lb reduction in weight as compared with the former model. For the single-stage drill running at 720 r.p.m. the weight is 35 lb, while the two-stage model which is arranged to operate at speeds of 600, 430 or 320 r.p.m. weighs 37 lb.

Steam Iron with Boiler Unit

For the use of tailors and pressers the "Simons" electric steam iron with a self-contained electric boiler unit is now being imported from Australia and marketed in this country by T.N.J. ELECTRICAL ENGINEERING CO., LTD., 1, Dove Road, N.1.

The boiler, which is lagged with slag wool and surrounded by steel protective casing, is equipped with an electric cut-out which automatically switches off the 1,500 W element when a steam pressure of 90 lb/sq in is reached (this takes 20-30 min) and switches it on again when the pressure falls to 65 lb/sq in. The steam release is operated by a foot treadle. A steam pressure gauge, water level indicator and steam safety valve are provided.

A choice of four irons is available, 4 lb, 7 lb, 10 lb and 15 lb, the elements of the first three being of 400 W while that of the 15 lb model is of 1,000 W. The complete one-iron unit is priced at from £101 6s to £112 8s according to the size of the iron: a double-iron unit costs from £174 0s 6d to £196 10s. An ironing stand costs £7 15s.

Thermostatic Iron

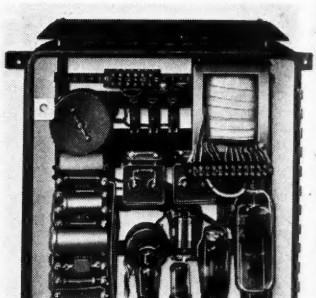
CLAYTON, LEWIS AND MILLER, LTD., 107, Fleet Street, London, E.C.4, announce the new "Clem" thermostatically controlled iron. The thermostat adjustment is conveniently placed at the rear of the streamlined body.

As an alternative treatment to highly polished chrome plate, the cover is finished in coloured polychromatic finish heat-proof enamel. The chromium plated model costs 42s 6d; with a coloured cover the price is 39s 6d.

Speed Control Unit

The speed of fractional h.p. d.c. motors of from $\frac{1}{16}$ to $\frac{3}{4}$ h.p. inclusive can be controlled over a range of up to 15:1 by the "Multi-Speed" electronic control unit developed by MACHINE TOOL ELECTRICS, LTD., London Road, Leigh-on-Sea, Essex.

Employing grid controlled rectifiers, the standard unit, which is supplied complete with motor, operates from either single- or three-phase 50 c/s mains and is housed in a sheet-steel cabinet suitable for wall mounting. The control station comprises the motor "on-off" switch, the variable-speed potentiometer knob and two pilot lamps. This can either be supplied as a separate unit or incorporated in the door of the main equipment.



Interior of the "Multi-speed" control unit

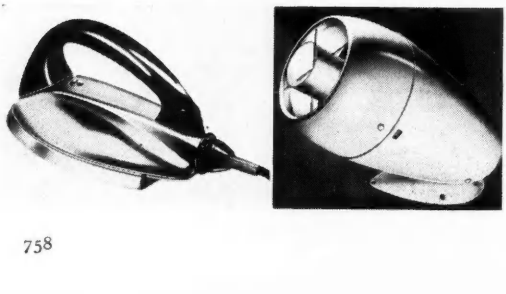
Document Copying Paper

PHOTOSTAT, LTD., Adelaide House, London Bridge, E.C.4, have introduced the "Duostat" photographic paper for the production of direct positive copies of documents and drawings. It is a low-speed contact printing paper on an extra light-weight moderately translucent base. It can be processed in the normal way and can be handled in subdued indirect daylight or tungsten lighting.

Reflector Spotlight

An attractively designed reflector spotlight fitting for the emphasis or high lighting of displays in shops, shop windows or other building interiors, is offered under the trade name "Comet" by CROMPTON PARKINSON, LTD., Crompton House, Aldwych, London, W.C.2. Incorporating a 150 W e.s. lamp, it may be fixed to the floor, wall or ceiling, and can be rotated through 360 deg or swung laterally through about 90 deg. The fitting is of light alloy construction and finished in cream enamel.

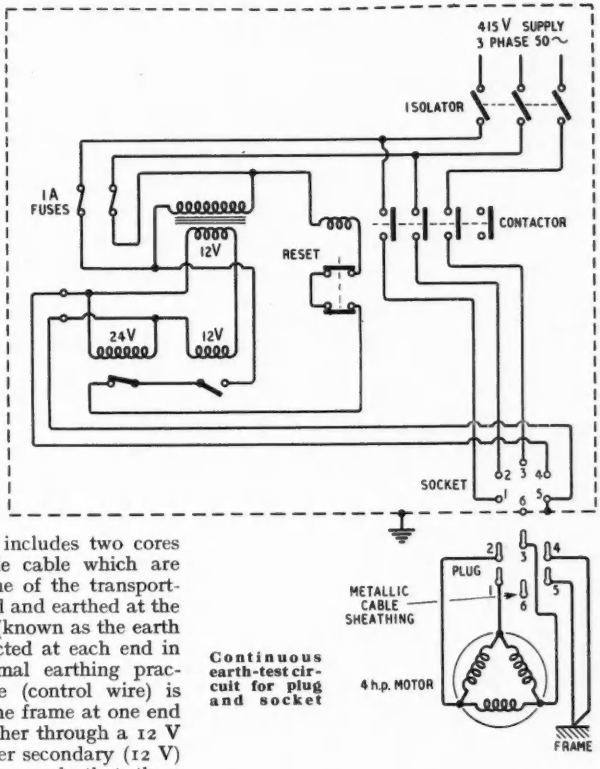
Left: "Clem" thermostatically controlled iron
Right: "Comet" 150 W reflector spotlight



Earthing Mobile Plant

Continuous Earth-Test Plug and Socket Outlet

A LARGE industrial organization was faced with the need to supply three-phase 50 c/s power at 415 V to a mobile stacker truck working in a situation in which it was felt that the risk of damage being done to the usual flexible cable connector might be greater than normal. A special circuit was accordingly devised to ensure, in the event of a mishap to the trailing cable, that excessive voltage could not build up on the frame of the truck.



Continuous earth-test circuit for plug and socket

The control circuit includes two cores (of a five-core flexible cable which are connected to the frame of the transportable stacker at one end and earthed at the other end. One core (known as the earth wire) is solidly connected at each end in accordance with normal earthing practice. The other core (control wire) is connected solidly to the frame at one end and to earth at the other through a 12 V relay and a transformer secondary (12 V) the arrangement being such that these cores carry a circulating current which will close the 12 V relay. This, in turn, will close the main contactor if the circuit is "healthy"; if the earth or the control wires break, the contactor will open.

A second relay, nominally 24 V, is connected across the earth and control leads in the plug-in socket outlet and opens the contactor coil circuit if the truck earth frame voltage exceeds, say, 15 to 18 V above earth potential. It is provided to guard against the occurrence of two faults: namely, earth wire breaking when a high resistance phase to earth fault is present in the equipment. If the phase fault were of such a nature as to hold in the 12 V relay (by the phase-earth current flowing down the control wire) and the 24 V relay were not fitted, it would be possible to have voltages in excess of 18 V on the frame of the portable machine.

As the transformer supplying the factory is on the premises and the neutral

point and "earth return" of the distribution system are solidly connected to the same earth plate, it was felt that "earth return" resistance of the fixed installation could be kept to under one ohm and the element of danger from this part of the system would be so small that it could be ignored. There is, of course, no risk above the normal in making this assumption.

The multi-core flexible connector cable is v.i.r. insulated and protected by a tough rubber sheathing, screened with cord and copper, p.c.p. sheathed, with a layer of hose canvas embedded in the overall sheathing. It was obtained from W. T. Glover & Co., Ltd. The multi-pin plug and socket outlets were made to the user's own instructions by the Ray Engineering Co., Ltd.

Universal Decimal Classification

Application to Electrical Engineering

By Major E. H. W. BANNER, M.Sc., M.I.E.E., F.Inst.P.

THE increasing use of the Universal Decimal Classification in electrical engineering literature will have been noticed by all readers. It has been used for some years in *Science Abstracts* and is now also being employed in the *Journal* and *Proceedings* of the I.E.E.

The origin is due to an American, Melvil Dewey, who in 1873 first put it into operation in a simple form. It has since been expanded considerably and although the Dewey system is still used, especially in non-technical libraries, the extended system is capable of much wider use, especially in applied science.

The U.D.C. is used by the three main international scientific libraries—the Science Library in London, the Engineering Science Library in New York and that of the Verein Deutscher Ingenieure in Berlin.

The system is primarily a classification of knowledge depending on related ideas and subjects. Secondly, it is universal in its endeavour to cater for all branches of knowledge, abstract and concrete, pure and applied. Finally, it is a decimal classification based on ten groups of branches of knowledge, but this does not mean that any particular subject is necessarily divided into ten divisions. The decimal notation aids the continued subdivision and introduction of intermediate terms as required by the expansion of knowledge.

The ten main domains are considered as forming the whole of knowledge, which is taken as unity, these domains being:—

0 Generalities.
1 Philosophy, psychology.
2 Religion, theology.
3 Social sciences, law, education.
4 Philology.
5 Natural sciences.
6 Applied science, medicine, technology.
7 Arts, entertainment, sport.
8 Literature.
9 Geography, biography, history.

Subdivision is based on these domains so that, for example, any subject in applied science has a number commencing with 6. Points are placed normally after each group of three figures to aid reading and, as the whole of knowledge is considered as unity as has already been stated, it is implied that any number is preceded by a decimal point, although the initial point is omitted in practice.

Main subdivisions of 6 are as follows:—

61 Medicine, anatomy, physiology, pathology, pharmacy.
62 Engineering.
63 Agriculture.
64 Domestic economy.
65 Commerce, communications, transport, business organization, printing, publishing.
66 Industrial chemistry, chemical technology.
67 Various industries and manufactures.
68 Various industries, professions and crafts.
69 Building industry, building construction.

Thus all engineering knowledge comes

under 62 and further subdivision to three figures gives, for example:—

621 Mechanical and electrical engineering.

A further decimal figure expands this to:—

621.0 General questions.
621.1 Steam engines, boilers, steam engineering.
621.2 Water power, hydraulic machines.
621.3 Electrical engineering.
621.4 Internal combustion engines and other special motors.
621.5 Pneumatic machines, refrigeration technique.
621.6 Ventilators and pumps, pipes.
621.7 Workshops, factories, individual processes.
621.8 Machine parts, means of conveyance on on the spot.
621.9 Machine tools, methods of manufacture.

It is often remarked that the wide subject of electrical engineering requires at least four figures (621.3), whereas physics and mechanics, related subjects, are covered by two figures (53). This is because at the date of origin of the system electrical engineering was very much in its infancy and the present growth of the subject quite unforeseen. Apart from this aspect the general situation is that the greater the number of figures the greater the subdivision and the further the removal from the general to the particular.

Main subdivisions under 621.3 are:—

621.31 Electrical engineering in general.
621.311 Power generation and supply, power stations.
621.312 Development of means for supply and utilization of electricity, electro-industry.
621.313 Electric machines.
621.314 Transformation, transformers, convertors, rectifiers, amplifiers.
621.315 Transmission, transmission and distribution lines, conductors, insulating materials, insulators, wiring.
621.316 Distribution, switchgear, regulation, protection, control.
621.317 Measurements, measuring instruments, indicators, tariffs.
621.318 Applied magnetism, magnetic apparatus and materials, coils, relays.
621.319 Applied electrostatics.
621.32 Electric lighting equipment, lamps.
621.33 Electric traction.
621.34 Electric drives apart from traction, application of electricity to industry, agriculture, etc.
621.35 Applied electrochemistry.
621.36 Electric heating, thermo-electricity.
621.38 Electronics, photocells, discharge tubes, X-ray equipment.
621.39 Telecommunication.

It will be noted that there is no 621.37. This number is employed in the original Dewey system for electrical measurements, which is 621.317 in the U.D.C. In the writer's opinion this is a source of weakness and the adoption of the "universal" system only is recommended.

In electrical engineering a further classification occurs under the numbers 621.3.0, which cover a wide range of auxiliary terms, such as range of voltage or current, individual parts of equipment, details of construction, etc. A typical example is 621.3.082, representing principles of measurement. Another is 621.3.023, representing high-frequency current (as distinct from low frequency).

Further Developments

Sufficient has been said to explain the general system and how it can be indefinitely extended as required. It is frequently necessary to give two or more U.D.C. references, where two or more aspects of the subject arise. An example occurs in measurements in electrical heating. Obviously two subjects are covered and they are related. Both numbers are required and their relation is shown by the colon sign:—621.317:621.36.

A common symbol is /, meaning the continuation from one to the other, inclusive; thus 621.32/.39 represents specialized electro-technology from 621.32 (electric lighting equipment) to 621.39 (telecommunication).

When two subjects occur in one paper, but without relation, such as a book dealing with electric lighting and heating, then the connection is the + sign:—621.32+621.36, but the plus sign is under review and may be replaced by &.

When more detail is required other auxiliary symbols are available, such as —. which (followed by a number) represents language and " " marks time, such as "1950.11.24," representing 1950, November 24, the order being as shown. Brackets ( ) cover various form numbers including scope of book or paper; sources of information; place, including country, etc. These further subdivisions are recommended only when necessary to the concept required for a particular purpose and should be avoided unless essential.

When papers (or books) are indexed under their U.D.C. numbers it is easy

to collect similar subjects together, either by the papers themselves or by index cards. When a compound number occurs the method then is to repeat each number separately; thus a paper marked 621.317:621.36 would be indexed both under 621.317 and under 621.36. In this way a search from either aspect would lead to the paper. Similarly for three or more related numbers.

Electrical engineering necessarily involves physics, so a U.D.C. reference may often occur under 5 (pure science) and 53 (physics) and then, alternatively, under 537 (electricity) or 538 (magnetism and electro-magnetism), each with its own subdivisions.

Another subject of electrical interest, standardization, is part of 3 (law) and is 389.6. As an example 389.6:621.317.7 is standardization of electrical instruments.

Perhaps it should be pointed out that the U.D.C. has no connection with decimal sectionalization where main section may be numbered 1, 2, 3, etc., and subdivided as 1.1, 1.2, 2.1, 2.2, 2.3, etc.

The U.D.C., being international, is employable in different languages for the same reference.

While the main editorial office is at The Hague, in Britain the system is promulgated by the British Standards Institution and is published in various parts, the relevant ones being parts of B.S.1000.

The part of interest to electrical engineers is Class 621.3, electrical engineering, price 10s. There is also an abridgement of the whole published as B.S.1000A:1948, abridged English edition, price 25s.

Farm Electrification

A LECTURE by Mr. C. A. Cameron Brown (British Electricity Authority) to the Association of Supervising Electrical Engineers this week in London dealt with the subject of farm electrification, chiefly by way of a descriptive commentary on a large number of lantern slides.

The lecturer's intention was to point out that during the last fifteen years the number of farms provided with electricity had trebled, the present figure within the B.E.A. area being some 97,000 farms connected. More than half had been connected since the middle of the war period; since then the rate of connection had risen steadily and was now about 13,000 farms a year.

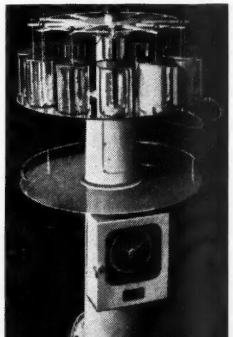
Even if that rate did not increase, its maintenance would mean some 240,000 farms connected by 1960. There would thus be plenty of scope for wiring and equipping farms for some time to come.

It was not the lecturer's purpose to deal with either policy or means of furnishing electricity to farms, but it did seem that the proportion of single-phase services would increase in future. So far as applications were concerned, the lecturer's aim was to skim lightly over the "field," pointing out extremes of call on resources and emphasizing that "low load" was the constant objective in the approach to this subject.

Tissue Processing

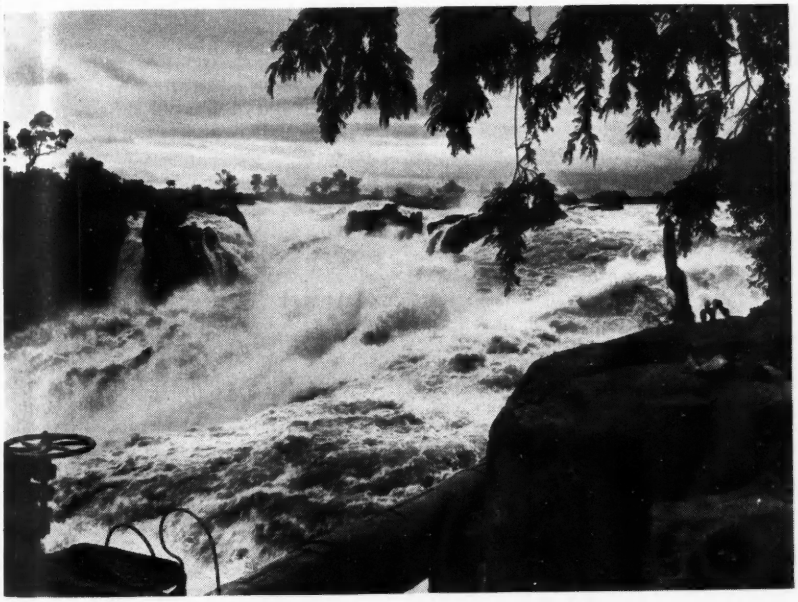
THE processing of tissue for diagnostic purposes can be carried out much more accurately and quickly by the use of the new "Histokine" automatic machine developed by Hendrey Relays, Ltd. Once set the machine will, without attention, go through the entire cycle of fixation, dehydration, infiltration, decalsification or staining of tissues to their final washing or setting in wax or celloidin. Specimens placed in the machine overnight are ready for diagnosis in the morning. Large numbers of specimens can be dealt with at the same time, and more thorough penetration of reagents is possible.

The timing mechanism, which controls the transfer of the basket containing the tissue from one beaker to another, consists of an a.c. motor with a time disc instead of hands, a lever making it possible to change over rapidly from one- to twenty-four hour operation. Notches on the disc arranged for any desired series of operations come in turn under a cam which energizes the lifting, turning and lowering mechanism. The electrically heated wax baths are thermostatically controlled. The machine costs £395.



"Histokine" tissue processing equipment

Brazilian Electrical Policy



From Our Correspondent in Brazil

TO maintain the pace of Brazil's wartime economic expansion, larger supplies of fuel and electrical energy have become essential. As national coal, although abundant, is of somewhat poor quality (9,000 B.Th.U. per pound) the Government is concentrating on the search for new oilfields, and the building of refineries to process imported crude oil until adequate supplies become available locally.

As regards electricity the official programme provides for fuller utilization of the hydro-electric power potential, estimated at 14.4 million kW, and the building of thermo-electric stations in districts remote from natural power sources, or in which additional supplies of electricity are urgently required pending the harnessing of falls. The capacity of existing installations is to be raised by 1,340,000 kW, at the rate of 8 per cent per year, 1,028,000 kW to be supplied by private enterprises, and new installations will be provided in districts where abundant natural resources await exploitation.

By these means expansion, which is being held up in several important industrial centres, will receive a new impulse; rural districts will be enabled to process their own raw materials, reducing costs and ensuring remunerative employment for the inhabitants; the construction of irrigation and drainage systems will be facilitated in zones subject to drought and flood; and the capacity of overloaded suburban railway lines can be increased by electrification.

The Brazilian Traction Light & Power,

The photograph on this page shows part of the Paulo Afonso Falls, on the San Francisco River, where a 120,000 kW hydro-electric development is being carried out

of Toronto, and the American and Foreign Power Company will be responsible for 710,000 kW of the proposed increase of 1,340,000 kW of installed capacity; the Companhia Hydroelectrica de San Francisco, which inaugurated a 5,000 kW station in October, will contribute a further 120,000 kW; a San Paulo syndicate, 126,000 kW; the States of Minas Geraes and Rio Grande do Sul, 226,000 kW and 110,000 kW; Mato Grosso, Parana, and other States will contribute the remainder. The total investment will be approximately £513 million, of which £189 million will be expended in foreign currency. It was originally hoped to complete the programme by the end of 1953, but at least two more years will be necessary.

Hydro-Electric Projects

The new installations include seven hydro-electric stations in Minas Geraes, on four of which work has been, or is about to be, started; one each in Parana, Maranham and Mato Grosso, and seven in Rio Grande do Sul, the projects having been approved but the work not yet begun; one in San Paulo, recently completed; two in Goias and one in Rio Grande do Sul, which are now under construction.

The installed hydro-electric capacity was raised from 1,496,000 kW in 1947 to 1,895,000 kW by the end of 1949. The Paraiba Basin is now being studied with a view to regulating the flow of water and increasing the potential power available in that rich, progressive region. Later, when the needs of the East, Centre and South have been attended to, those of the less densely populated North will be dealt with. Relatively few districts beyond Ceara possess supplies of electricity, and as a result many natural resources remain unexploited.

Heavy imports of electrical material will thus be called for during the next few years, not only to carry out the Government's programme but to supply the requirements of new enterprises and activities, such as drainage and irrigation systems, road-building, the equipment of factories and cold storage plants, mining and the electrification of railways. The bulk of the material acquired to date has been purchased in the United States, practically the only source of supply open in the immediate post-war period. Moreover, three of the companies which are increasing capacity have obtained loans there to finance imports. In 1947 62 per cent of Brazil's total foreign purchases were made in the United States, but during the first nine months of 1949 the proportion dropped to 24 per cent.

Brazil's foreign trade is now tending to revert gradually to the pre-war position, when 23 per cent of the imports came from the United States and 53 per cent from Europe. Brazil cannot export sufficient merchandise to the United States to balance imports on a very large scale. Provided Great Britain can meet the demand at satisfactory prices, she should obtain a good share of future orders for electrical equipment, particularly as British electrical goods have always enjoyed a high reputation in Brazil.

The situation last year was abnormal. Imports from Great Britain increased by £7.6 million, but this country could not supply the foodstuffs required in exchange and a serious shortage of sterling resulted. Stocks have since accumulated, however, and record harvests are expected in 1950, so that the exchange situation should improve and licences to import from the United Kingdom be granted with greater freedom, As large quantities of electrical material will be required to further the Government scheme, and much of it will be ordered through official departments, these imports will receive preferential treatment in the distribution of exchange cover.

Power for Goldfields

THE South African Electricity Supply Commission has made a start on clearing and levelling the site for the new Vierfontein power station, which will supply power to the Free State goldfields. The station will be sited on an extensive field of low-grade coal (about 9,000 B.Th.U./lb as fired, 22 per cent ash content and 20 per cent volatile matter). The total capacity will eventually be 200 MW. In the first of the three stages of construction five 30,000 kW English Electric turbo-generators and nine 210,000 lb/hr International Combustion boilers will be installed. One set and two boilers should be ready early in 1953 and the remainder are scheduled to be brought into operation at six-monthly intervals.

French Coalfield Plant

Use of Low-Grade Fuel

By Our Paris Correspondent

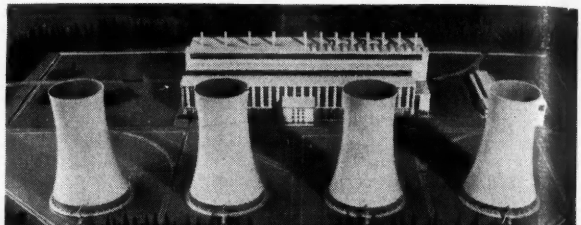
ELECTRICAL equipment is to play a large part in the French efforts to increase production from the nationalized coal mines and to reduce costs. The programme of construction of new steam power plants in the Lorraine basin is based on the use of poor quality coal which is available there (10,000 tons daily for 100,000 kW installed) and gradually 600,000 kW is to be installed. The first stage (400,000 kW) corresponds to the extraction of 43,000 tons daily, envisaged for 1952, while the second stage in the development of the basin will involve the installation of 200,000 kW when extraction reaches 65,000 tons daily. The total will be divided into 400,000 kW at Carling and 200,000 kW at Grosbliederstroff. At the moment 300,000 kW of plant has been ordered.

The Carling plant, which has been named the Emile Huchet plant, after its director, will consume poor quality coal from the Saar and Moselle districts. Together the two plants will produce 1,600

Work in progress, August 1948, on first half of the station site situated in a clearing among trees

to 2,000 million kW annually, of which over half will go to the French network; the rest will be used for local needs.

The Carling plant will comprise four 100,000 kW groups and the first portion is expected to be in service this year with another portion in 1951. The main building, of reinforced concrete, comprises a machine room, pumping room, boiler room with pulverizing installations, and control room. Water for the condensers will be cooled in hyperbolic concrete towers (one per 100,000 kW group) which will have a base diameter of 60 metres and be 85 metres high. Each tower will cool 22,000 cu. m. of water hourly.



Model of Carling with one cooling tower for each 100 MW of plant

A 220/150/65 kV sub-station, which has been planned in conjunction with Electricité de France and will serve jointly the E.D.F. and the Lorraine basin mines, will be installed at about 1.8 km from the power plant and will assure distribution of power as well as effect interconnection of the 65 kV mining network with the 150 kV and 220 kV Electricité de France networks. Connectors between the plant transformers and the distribution station will be fluid oil cables supplied by Câbles de Lyon.

E.A.W. CONFERENCE

THE Silver Jubilee Conference of the Electrical Association for Women is to be held in Perth from 1st to 6th May. There are no business meetings on the first day (Monday), when the golf competition for the Lady Hughman Challenge Bowl will take place.

The president of the Association, the Dowager Lady Swaythling, will preside at the opening session of the conference on the Tuesday morning, when Mr. P. J. Noel-Baker, Minister of Fuel and Power, and Mr. T. Johnston, chairman of the North of Scotland Hydro-Electric Board, will speak. A paper by Sir Edward MacColl, deputy chairman of the Hydro-Electric Board, follows on "Hydro-Electric Development in the Highlands." The annual general meeting is arranged for the afternoon, the evening being left free for a visit to the Perth Repertory Theatre if desired.

The Council meeting on Wednesday will be followed by the annual luncheon, at which the speakers will be Lord Citrine, chairman of the British Electricity Authority, and the Countess of Elgin and Kincardine, president of the E.A.W. Dunfermline Branch. In the afternoon there will be an informal visit to the North of Scotland Hydro-Electric Board's Exhibition in the Drill Hall, Tay Street. A civic reception and dance at the City Hall will occupy the evening.

Thursday has been reserved for visits to the Pitlochry and Tummel Garry hydro-electric schemes. The E.A.W. Scottish Branches will hold a party in the evening. Tours of Edinburgh, the Scott Country and the Border Abbeys of Melrose and Dryburgh are planned for the Friday, with a visit to Loch Sloy on Saturday.

New E.A.W. Branches

New branches of the Electrical Association for Women have been formed at Bournemouth and Dartford.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE National Coal Board has appointed Dr. **J. Bronowski** as director of its Central Research Establishment at Stoke Orchard, near Cheltenham. Dr. Bronowski, who is at present assistant chief scientific adviser at the Ministry of Works, takes up his new appointment on 22nd May.

Mr. S. F. Herne, Birmingham area representative of Gent & Co., Ltd., recently completed fifty years' service with the company, and to mark the occasion he has been presented with a cheque. The presentation was made by Mr. K. Parsons (managing director), and others present at the ceremony were Mr. O. E. Kinsey (director and secretary), Mr. H. Waddington (director) and Mr. R. Swift (works director).

Major-General Sir Harold Wernher, Bt., G.C.V.O., chairman of Electrolux, Ltd., who has completed twenty-five years as chairman of the company, recently celebrated the occasion by entertaining 300 members of the staff to dinner at the May Fair Hotel, London.

Mr. Oliver Lyttelton, chairman of Associated Electrical Industries, Ltd., is chairman of the Conservative Party's Parliamentary Trade & Industry Committee for the current session. Mr. Harold Macmillan is deputy chairman; Sir Arnold Gridley and Mr. Walter Fletcher, vice-chairmen; and Messrs. F. J. Erroll and W. S. Shepherd hon. secretaries.

Aberdare Cables, Ltd., has recently appointed **Mr. K. R. Brooker,** A.M.I.E.E., as chief development and process engineer to establish the manufacture of super-voltage cables and other projects. Mr. Brooker was trained at Erith Technical College and Woolwich Polytechnic, and had factory experience at the Erith Works of the old Callender Co. and later with British Insulated Callender's Cables. He held various positions both in the technical and production organizations of these companies, specializing in his early days in dry core telephone cable, and more recently in all types of power cables up to 264 kV. For the past ten years he has been the cable designs and specifications engineer at the Erith factory, which he also represented on several C.M.A. technical committees.

Mr. K. R. Brooker

Mr. G. F. Sinclair, C.B.E., M.I.E.E., A.M.I.Mech.E., M.Inst.T., chairman of the Public Transport Association, who will preside over the annual conference of the Association which is being held in Brighton next week, is chief technical planning and supplies officer of the London Passenger Transport Board. Mr. Sinclair first became associated with London Transport in 1930, when he joined the L.C.C. Tramways, becoming rolling stock engineer in 1932. He was appointed chief engineer (trams and trolley-buses) of the London Passenger Transport Board in 1940, and was director of transport to the United Kingdom Commercial Corporation in the Middle East from 1940 to 1944, being awarded the C.B.E. He became deputy general manager (road services) of the L.P.T.B. in October, 1945, and took up his present appointment in 1947.

Mr. G. F. Sinclair

Mr. J. P. McMurray, who was for many years chief works accountant to the English Electric Co., Ltd., Stafford, has retired. Mr. McMurray had been in the engineering industry for nearly fifty years, and before joining the English Electric Co. he was with the Metropolitan-Vickers Electrical Co., Ltd., in Sheffield. On 3rd April Mr. G. A. Riddell, chief accountant, presented Mr. McMurray with a gold watch and a wallet of notes. He was also presented with a pair of marcasite ear-rings for Mrs. McMurray. Mr. McMurray is leaving Stafford shortly for Scotland.

Mr. J. H. Wears, who during the war was responsible for the production of thousands of tanks at the Stafford Works of the English Electric Co., has also retired. Mr. Wears joined the company in 1928 as superintendent of the Switchgear Department. In 1934 he was appointed chief superinten-

dent, Stafford Works, and on the outbreak of war he was placed in charge of tank production. The first tanks that came from the production lines were the Covenanter and the Centaur. These were followed by the Cromwell and the Comet. In recognition of his services Mr. Wears was awarded the O.B.E. In 1942 was appointed works manager of the Armoured Vehicle and Welding Department. On 30th March he was presented with a car radio set which had been subscribed for by workers in the welding works and foundry, Mr. C. H. Shardlow making the presentation. A further presentation is to be made to Mr. Wears by members of the management.

Mr. A. E. Baker has recently retired from the position of manager of the South Western Electricity Board's Paignton Branch. Before nationalization Mr. Baker had been engineer and manager of the Paignton Electric Light and Power Co., and on retirement had completed forty years' service in the electricity supply industry. At a farewell dinner Mr. Baker was presented with an electric clock and a long-service certificate by Mr. H. Midgley, deputy chairman of the Board, who paid tribute to his long and efficient service. On behalf of the staff, Mr. W. E. Johnson, mains engineer at Paignton, presented Mr. Baker with a bookcase. **Mr. S. J. Swain** has been transferred from Brixham to succeed Mr. Baker as manager of the Paignton Branch.

The Railway Executive announces that with the concurrence of the British Transport Commission, **Mr. H. H. Swift,** B.E., M.I.E.E., acting electrical engineer, Eastern and North Eastern Regions, has been appointed executive officer (electrical engineering, new works and development), Railway Executive Headquarters, London. Mr. Swift was educated at St. Peter's College, Adelaide, South Australia, and at the Adelaide University, where he obtained the degree of bachelor of engineering. He subsequently entered the works of Siemens Schuckert in Berlin, and on the outbreak of the 1914-1918 war was interned as a civilian prisoner-of-war at Ruhleben. After the war, Mr. Swift joined the English Electric Co., Ltd., and was employed on important electric traction schemes in Japan, South Africa, Denmark and Poland. In 1936 he joined the L.N.E.R. as assistant electrical engineer, when he was chiefly engaged in the scheme work for the electrification of the lines between Manchester and Sheffield and from Liverpool Street to Shenfield. Mr. Swift became assistant chief electrical engineer of the L.N.E.R. in 1941 when the department of the electrical engineer was separated from that of chief mechanical engineer, and on nationalization in 1948 he was made electrical engineer (acting), Eastern and North Eastern Regions, British Railways.

Mr. H. H. Swift

Mr. D. N. Dale has been appointed advertising and publicity manager to the Tube Investments subsidiary, the Simplex Electric Co., Ltd., of Oldbury, Birmingham. He took up his new duties on 17th April. Mr. Dale, who is the son of Mr. V. W. Dale, general manager and secretary of the British Electrical Development Association, was previously engaged on publicity work for the Hotpoint Electric Appliance Co., Ltd., and the International Refrigerator Co., Ltd. Before that he served on the editorial staff of a number of newspapers and agencies.

Mr. D. N. Dale

Mr. P. J. Shipton, M.I.E.E., M.I.P.E., for the past eight years general manager of Cantie Switches, Ltd., is taking up an appointment on 1st May with J. Brockhouse & Co., Ltd., as general manager of their Elms Works, Wolverhampton.

On 12th April area radio representatives and several members of the head office executive staff of the Edison Swan Electric Co., Ltd., were entertained by the **Plessey Co., Ltd.,** at its Swindon factory, a comprehensive tour of which enabled the visitors to see in process of manufacture some of the equipment they distribute.

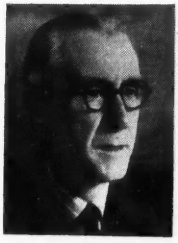
The Dramatic & Operatic Society of **W. T. Glover & Co., Ltd.,** Manchester, recently presented "Black Limelight" a thriller by Gordon Sherry. This play was their first production since the war and the first on the stage of the new works theatre, recently named the Chandler Hall by Mr. D. T. Hollingsworth, general manager, to the memory of Major A. L. Chandler, M.C., the late chairman of the company. Though this was a difficult first post-war effort for an amateur society to undertake, Miss Gillian Markill as Mrs. Charrington, Mr. Eric Ormrod as Peter Charrington, Miss Peggy Johnson as Jemima and Mr. Rupert Denman as Lawrence Manfred, gave excellent performances well supported by the entire cast.

OBITUARY

Mr. E. C. Hart.—The death occurred recently in Dublin at the age of seventy-five of Mr. Edwin Caithness Hart, director of Exide Batteries (Ireland), Ltd., and of Battery Makers (Ireland), Ltd. Mr. Hart, who was born in Edinburgh, joined the Chloride Electrical Storage Co., Ltd., in 1906. He represented the company for the whole of Scotland, Ireland and the North of England until 1919, when the increasing business in Ireland demanded his full time and caused him to settle there . Mr. Hart was a past president of the Electrical and Allied Trades Golf Association.

Mr. William Milne, for many years an executive of the British Driver-Harris Co., died on 26th March. Mr. Milne joined the staff of the organization at Manchester during the 1914-18 war. In 1923 he was appointed sales manager, a post he held for twenty-five years, and in 1946 he became a director of the company, but retired from the board in September, 1948.

Mr. G. J. Hollyer.—The death occurred last Saturday morning of Mr. G. J. Hollyer, M.I.E.E., who was manager of the Torquay and West Devon Sub-Area of the South Western Electricity Board. From 1st April this Sub-Area was merged under a re-grouping scheme and at the time of his death he was dealing with the administrative work in connection with that merger. Mr. Hollyer recently completed forty-four years with the electricity supply industry and was due to retire in June. After being articled to a London firm of contractors he joined Walthamstow Urban District Council in 1905 as station superintendent and remained with that undertaking until 1927, becoming deputy electrical engineer. He then went to Loughborough as borough electrical engineer and manager, and in December, 1929, joined the Torquay undertaking as borough electrical engineer and manager, serving in that position until vesting day.



The late Mr. G. J. Hollyer

Mr. W. A. Lowndes.—The death has occurred, at the age of fifty-three, of Mr. William Arthur Lowndes, chief designer and head of the drawing office of Whipp and Bourne, Ltd. Mr. Lowndes commenced his career with the Metropolitan-Vickers Electrical Co., Ltd., and later went to Ferguson, Pailin, Ltd., being appointed in 1920 a designer with Whipp and Bourne, Ltd. Since 1933 he had held the position of chief designer and had been in charge of the drawing office. He was a member of one of the panels of the United Kingdom Advisory Committee which represented Great Britain on the question of the formulation of an international code of practice for electrical installations in ships. The funeral took place at Rochdale Crematorium on 13th April. All the directors of Whipp and Bourne, Ltd., were present and every department was represented.

Ald. H. L. Kirby Johnson, former managing director of the Martindale Electric Co., Ltd., died suddenly while attending a meeting in London on 13th April. He retired from the Martindale company a little over a year ago.

WILLS

Mr. J. P. D. Coleman, late a director of Wild-Barfield Electric Furnaces, Ltd., Watford, and its associated company, G.W.B. Electric Furnaces, Ltd., who died on 20th November last, left £5,421 gross (£5,296 net).

Mr. D. J. Strutt, late of the British Thomson-Houston Co., Ltd., for whom he was commercial engineering representative in the Midlands, left £3,111 gross (£3,022 net).

Sir Arthur Henry McMahon, G.C.M.G., G.C.V.O., K.C.I.E., C.S.I., chairman of the Oriental Telephone & Electric Co., the China and Japan Telephone Co., and other concerns, wro died on 29th December last, left £26,918 gross (£21,994 net).

Mr. R. J. McLeod, chairman and managing director of the Power Plant Co., Ltd., who died on 27th Dec. last, left £30,312 gross (£29,155 net).

Mr. S. J. Watson, M.Inst.C.E., M.I.E.E., late manager of the South-East England District of the Central Electricity Board, who died on 18th Nov. last, left £12,559 gross (£12,358 net).

E.I.B.A. Branch Activities

As a result of the dance organized by the Birmingham Branch of the Electrical Industries Benevolent Association held on 17th February at Tube Investments Social Club, Oldbury, the Association will benefit to the extent of £274. The Branch is holding a carnival dance at the Magnet Club, Witton, Birmingham, on 6th October next.

The Gloucester Branch of the Association is breaking new ground by holding a garden party on 3rd June next in the grounds of "Southwood," Cheltenham, the property of the Midlands Electricity Board.

NEXT WEEK'S EVENTS

Monday, 24th April

BIRMINGHAM.—Imperial Hotel, 6 p.m. I.E.E. South Midland Supply and Utilization Group. Annual general meeting. "The Detection by Oscillographic Methods of Winding Failures during Impulse Tests on Transformers," by E. C. Rippon and G. H. Hickling.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. Discussion on "The Relation between Production, Operation and Maintenance of Service Radio Equipment," opened by D. H. Hughes.

SHEFFIELD.—The University, Western Bank, 6 p.m. I.E.S. Sheffield Centre. Annual general meeting.

Tuesday, 25th April

BIRMINGHAM.—Institute of Welding. Conference of Branch officers and spring meeting. (Continued on 26th, 27th and 28th April.)

BRIGHTON.—Metropole Hotel. Public Transport Association. Annual conference. (Continued on 26th and 27th April.)

GLASGOW.—At the Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, 7 p.m. I.E.E. Scottish Centre. Annual general meeting.

LUTON.—Chamber of Commerce, 7.30 p.m. Luton Electrical Society. Annual general meeting, followed by a group discussion: "Electrical Faults."

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Supply Group. "The Cost and Efficiency of Earthing on Low- and Medium-Voltage Overhead-Line Systems," by L. Gosland.

Wednesday, 26th April

HUDDERSFIELD.—Y.E.B., Market Street, 6 p.m. I.E.E. North Midland Centre. "Fault-throwing Tests on the 132-kV Grid System under Normal Working Conditions," by W. Casson and F. H. Birch. (Joint meeting with North-Western Centre and Sheffield Sub-Centre.)

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Supply Section. "Design of Power Transformers to withstand Surges due to Lightning, with special reference to a New Type of Winding," by A. T. Chadwick, J. M. Ferguson, D. H. Ryder, and G. F. Stearn.

I.E.E. London Students' Section, 2.15 p.m. Visit to Micanite & Insulators Co., Ltd., Walthamstow.

WEYMOUTH.—Royal Hotel, 6.30 p.m. I.E.E. Southern Centre. District meeting. "Rationalized M.K.S. Units in Electrical Engineering Education," by E. Bradshaw.

Thursday, 27th April

BIRMINGHAM.—James Watt Memorial Institute, 6 p.m. I.E.E. South Midland Radio Group. Annual general meeting. "Energy Conversion Devices for Electrical and Electronic Measurement of Non-Electrical Quantities," by J. C. Finlay.

LONDON.—Savoy Place, W.C.2. I.E.E. extra meeting. "The Design and Operation of a 30 MeV Synchrotron," by D. W. Fry, J. Dain, H. H. H. Watson and H. E. Payne. "The Design of Electron Synchrotrons," by F. K. Goward, J. D. Lawson, J. J. Wilkins, and R. Carruthers.

Connaught Rooms, W.C.2. Institute of Fuel, 11 a.m. Annual general meeting, followed by presidential address, "Education and Survival," by Dr. D. T. A. Townend. 1 p.m. Annual luncheon.

RUGBY.—E.M.E.B. Showrooms, 6.30 p.m. I.E.E. Rugby Students' Section. Annual general meeting. "Inductor Alternators," by K. F. Raby and D. J. Pitstow.

Friday, 28th April

HUDDERSFIELD. — Electricity Showrooms, Market Street, 7.15 p.m. I.E.S. Huddersfield Group. Annual general meeting, followed by a film show.

LONDON.—Connaught Rooms, W.C.2, 6.15 for 6.45 p.m. Junior Institution of Engineers. Annual dinner.

Saturday, 29th April

LONDON.—Victoria Halls, W.C.1, 7 p.m. I.E.E. London Students' Section. Spring dance.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Obections may be entered within a month of the dates mentioned.

5th April

TECHNICOLOR. No. 681,473. Class 9. Photographic apparatus, cinematographic apparatus, television apparatus, apparatus capable of transmitting and receiving pictures in colour, and talking machines.—Technicolor Motion Picture Corporation, Hollywood, California, U.S.A. Address for service, c/o Wm. Brookes & Son, 1, Quality Court, Chancery Lane, London, W.C.2.

12th April

LIMIT. No. 683,352. Class 7. Electric motors (not for land vehicles) and electricity generators. —Limit Engineering Co., Ltd., 15-29, Windsor Street, Essex Road, Islington, London, N.1.

TEDDINGTON CONTROLS (design). No. B671,417. Class 9. Electrical relays and electrical solenoids, all for use in aircraft; and solenoid-operated valves for controlling the flow of air to and from pneumatic jacks (parts of aircraft installations), solenoid-operated valves for use in the remote control of hydraulic jacks (parts of aircraft installations), and solenoid-operated valves for use in the remote control of the flow of petrol to aircraft engines.—Teddington Controls, Ltd., Cefn Coed, near Merthyr Tydfil, South Wales.

CREDA CADET. No. 685,074. Class 11. Installations and apparatus for cooking and heating purposes.—Simplex Electric Co., Ltd., Broadwall Road, Oldbury, near Birmingham.

Commerce and Industry

Boilers for the B.E.A.

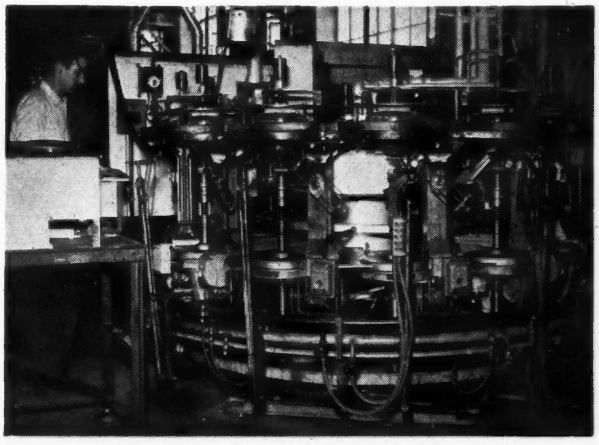
B.I.F. Admission Arrangements

THE British Electricity Authority has accepted John Brown & Co., Ltd., as contractors for the manufacture of boilers for electricity generating stations. For this purpose the company has entered into arrangements with Mitchell Engineering, Ltd., for the use of their designs and engineering information. Manufacturing work will be undertaken mainly at the company's shipyard and engineering works, Clydebank. New shops are also to be built at Whitecrook, Clydebank. Certain specialized manufacture is to be undertaken at the works of a number of subsidiary and associated companies.

Admission to the B.I.F.

Arrangements have been completed for the admission of trade buyers and members of the public to the 1950 British Industries Fair to be held from 8th to 19th May at Earls Court and Olympia, London, and at Castle Bromwich, Birmingham. For overseas and home trade buyers the Fair buildings will be open from 9.30 a.m. to 6 p.m. from 8th to 18th May, except Sunday, when the Fair will be closed, and from 9.30 a.m. to 4 p.m. on the last day, 19th May.

Overseas trade buyers presenting an official invitation or business card at any entrance to the Fair buildings will be given an overseas buyers' badge giving them free admission to all sections and all buildings during the hours of opening. The badge is a white plastic representation of the B.I.F. cog-wheel motif. Home trade buyers will be issued with a similar, yellow, badge on presentation of a business or invitation card and on payment of 2s 6d. Badges will be issued to home buyers only at the Fair and not in advance. As in previous years, admission of members of the public to the Fair is restricted in the interests of trade buyers and exhibitors. The public will be admitted to Earls Court and Olympia, in London, on Saturday, 13th May, and on Wednesday, 17th May, between 9.30 a.m. and 6 p.m. The admission charge to each building will be 1s 6d. In Birmingham, the public will be admitted daily between 2 p.m. and 6 p.m. (at a charge of 2s 6d).



Mullard machine for joining glass parts, showing the necks and heads of the television picture tubes clamped in the work heads

Cathode Ray Tube Manufacture

A fully automatic machine, recently developed and installed in the main Mullard valve factory at Mitcham, Surrey, is capable of joining together the necks and heads of television picture tube bulbs at the rate of sixty an hour. It is thus possible to produce 500 bulbs in a normal working day, or nearly 1,300 in a day of three shifts. For working in conjunction with this machine, others have been developed for gauging, cutting, glazing and flanging the necks of the bulbs before the joining operation. With the addition of special handling equipment and the installation of a fully automatic annealing tunnel or lehr, the finishing of

Carron cookers in the window display at the Y.E.B. Leeds showrooms

television picture tube bulbs is now being carried out on a continuous, high-speed, mass-production basis. The importance of this development may be judged from the fact that the output of conventional glass-parts-joining lathes is usually no more than about thirty bulbs a day.

Machinery Traders' Convention

The first convention of the Electrical Machinery Traders' Association is being held at Buxton on 25th and 26th April. On the second day papers will be presented by Mr. J. S. Hann (Griffiths Bros. & Co., London, Ltd.) on "Modern Methods of Impregnation with Varnish of Electrical Machinery," and by Messrs. T. A. Atkinson and R. H. Gill on "The Unusual in Repair-Shop Practice." The annual general meeting will be held on the same day.

Fashion Parade Lighting

At the Jersey Fashion Parades, 1950, to be held in London this spring, a new technique of presentation will be employed. A part of the salon will be converted into a small stage and "Atlas" fluorescent theatre lighting equipment, recently designed and introduced by Thorn Electrical Industries, Ltd., will be used. The clever mixing of pink, blue, green and white fluorescent light will show the frocks in brilliant sunlight and the colour of a winter morning, in the atmosphere of restaurant or night club, and in dramatic contrast, the blue glow of a moonlit night.

Cooker Window Display

The latest display in the main showroom window of the Yorkshire Electricity Board, Leeds, shows the "H" series of electric cookers made by Carron Company. This display lays emphasis on the spacious oven and the accessibility of all parts for cleaning. The effectiveness of the layout of the display is shown in the accompanying picture.

Cookery Demonstration Unit

As one means of reinforcing its drive to increase cooker sales the South Western Electricity Board has put a transportable cookery demonstration and display unit into service in the Bristol district. This unit enables demonstrations to be given in public halls in the city, and so to some extent overcomes the handicap imposed by the present lack of an adequate demonstration theatre, pending completion of the new Bristol Service Centre on the ground floor of the headquarters building at Electricity House.

Two series of afternoon and evening demonstrations have so far been held in suburban halls and the average attendance at each session has been about fifty. Numerous inquiries have been received as a result of the demonstrations and supporting

The cookery demonstration unit of the South Western Electricity Board

local publicity, and excellent sales figures have been achieved. Further demonstrations are being planned and arrangements are being made, in conjunction with the educational authorities, for senior schoolgirls to attend some of the afternoon sessions.

Magnetic Steel Castings

There has recently been published B.S. 1617, within the general engineering series, but intended for use when steel castings of high magnetic permeability are needed for electrical purposes. It sets out the chemical compositions of, and mechanical tests for two grades of castings, with their magnetic properties, and recommendations for welding. Copies at 2s. post free are obtainable from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Magnet Alloys

Developments in modern magnet alloys are described by Alan Torry and Alun Edwards, in an article in the March issue of the *Nickel Bulletin*. Some idea of the progress made in permanent magnet materials since the beginning of the century may be gathered from a diagram, among others appearing in this article, which stresses the importance of the research carried out by the Permanent Magnet Association in Sheffield and its member firms. Some of the mechanical uses of alloys of the kinds referred to are dealt with in the April issue of the *Bulletin*.

Selling to America

A nicely printed brochure, "First Steps in United States Markets," has been published by Colman Prentis & Varley, 34, Grosvenor Street, London, W.1 (and New York). The author is Richardson Wood, M.A., a member of the Market Research Council, New York. On the cover is an area map of the United States upon which is superimposed a map of Europe (excluding Russia and Scandinavia) to show the extent of the territory to be covered. The first section deals with regions and population; this is followed by "Cities and Shopping Areas," "Industrial Markets," and "Farm Markets." After some notes on types of retail stores there is a general survey of selling methods. The first steps in testing a market are suggested.

Radio for Jamaican Police

An order for radio equipment for the police of Jamaica has been placed with Marconi's Wireless Telegraph Co., Ltd., and comprises two 50 W v.h.f. transmitters (type TPV.471A), two Marconi type H.16A transmitter-receivers for linking headquarters to these main transmitters, and seven Marconi transportable transmitter-receivers type H.16. Five of these H.16 equipments are being installed in Vauxhall "Velox," six-cylinder, 2½-litre cars, and the remaining two in police launches.

House of Commons Guide

The "Guide to the House of Commons, 1950" (320 pp. and map), published by *The Times*, Printing House Square, London, E.C.4, is a comprehensive biographical list not only of members elected to the House in February, but also of the unsuccessful candidates. In each case the figures of the poll are given. In addition to this there is a great amount of other Parliamentary information, making the volume well worth its price, 10s 6d.

Television in Canada

Electrical News and Engineering (Toronto) reports that the C.B.C. is studying preliminary plans for a television service and work on the construction of the station buildings in Toronto is expected to begin within a few months. The 5 kW transmitter has been ordered from the Canadian General Electric.

Extensions at Yallourn

Mr. R. A. Hunt, chairman of the Victorian State Electricity Commission, recently announced that an order for two generators costing nearly £A1,000,000 for the Yallourn power station had been placed with C. A. Parsons & Co., Ltd.

Trade Announcements

The Dundee office and stockroom of the **Hoffmann Manufacturing Co., Ltd.,** is removing to new premises at 80, Bell Street, Dundee, which will be officially opened on 29th May next.

H. Fisher (Oldham), Ltd., and **E.M.I. Suppliers, Ltd.,** of Hayes, have just completed negotiations for the distribution of the Fisher range of products in many parts of the world. From 1st April E.M.I. Suppliers, Ltd., are acting as principal agents for Fisher products through their overseas organization, in many countries. This arrangement does not affect the agreements reached earlier with Standard Telephones & Cables, Ltd., to represent Fishers in the South American markets, and with the Philips Electrical concern, who have been appointed Fisher agents in Norway.

Ekco-Ensign Electric, Ltd., announces that Mr. A. H. Robertson has been appointed to represent the company in area 61, covering Argyll, Stirling, Dunbarton, Renfrew, Ayr, Lanark, Wigtown, Kirkcud-

bright, Dumfries and Clackmannan. Mr. Robertson is the son of Mr. A. C. Robertson, the company's representative for Central Glasgow area.

Edstone, Ltd., export distributors and sole concessionaires for "Lectrona" loudspeakers, will be moving to 15, Buckingham Palace Gardens, London, S.W.1 (telephone: Sloane 0621), on 24th April.

B. W. Hjorth A/S, Baunegaardsvej 27, Gentofte, Copenhagen, have been appointed exclusive agents in Denmark for the products of the **Brush Electrical Engineering Co., Ltd.**

C. A. Parsons & Co., Ltd., have opened a new office at 3, Royal Chambers, Park Place, Cardiff (telephone: Cardiff 7679).

Gauge & Tool Makers' Handbook

A fourth edition of the "Handbook" of the Gauge and Tool Makers' Association (Standbrook House, Old Bond Street, London, W.1) is now available. This sets out the aims and objects of the Association and briefly surveys its services and activities. The bulk of the volume is devoted to alphabetical and classified lists of members.

"Progress in Horticulture"

In the article by Mr. A. W. Gray on this subject in our issue of 17th March (p. 497) a picture of a greenhouse soil-warming installation appeared. This was attributed to the Midlands Electricity Board but actually it was an installation put in by the South Western Electricity Board at the nurseries of T. H. Biddick & Sons, Trevone, Padstow, Cornwall.

Catalogues and Lists

Austin Walters & Son, Ltd., Ayres Road, Old Trafford, Manchester, 16.—Priced folder on neon sign transformers.

Heyes & Co., Ltd., Water-Heyes Electrical Works, Wigan, Lancs.—Priced catalogue of "Wigan" mining type signalling and telephone equipment.

Bowthorpe Electric Co., Ltd., Tinsley Lane, Crawley, Sussex.—Two leaflets, Nos. B.103 describing line connectors and B.102 giving details of service insulators.

Berry Wiggins & Co., Ltd., Field House, Breams Buildings, Fetter Lane, London, E.C.4.—Illustrated brochure describing the applications and properties of "Tensulac" bitumen paint.

Metway Electrical Industries, Ltd., King Street, Brighton, 1, Sussex.—Priced catalogue of conduit fittings and wiring accessories.

Cantie Switches, Ltd., Port Causeway, New Ferry, Birkenhead, Cheshire.—Priced folder of metal-clad switches and switch-fuses rated at from 15 A to 100 A at 500 V.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Brochure dealing with industrial metal-clad distribution systems.

Hackbridge & Hewittic Electric Co., Ltd., Hersham, Walton-on-Thames, Surrey.—Catalogue (R228) of battery charging equipment.

Bill Switchgear, Ltd., Aston Lane, Perry Barr, Birmingham, 20.—Five priced catalogues of the company's range of switchgear and electrical accessories.

Wolseley Sheep Shearing Machine Co., Ltd., Wolseley Works, Witton, Birmingham, 6.—Folder illustrating industrial electric clipping machines for the carpet, boot, glove, brush and other trades.

E. N. Mackley & Co., Hawks Road, Gateshead, Co. Durham.—Brochure No. 109A on the "Acomb" sequence control switch for belt conveyors.

A. E. Cawkell, 7, Victory Arcade, The Broadway, Southall, Middlesex.—Technical leaflet describing a highly stabilized power supply unit.

Electricals, Ltd., 14, Claremont Place, Newcastle-on-Tyne, 2.—Priced catalogue of "Stabilag" infra-red heating jackets and associated accessories.

C. W. Outram & Co., Ltd., Woodville, Derbyshire.—Two descriptive folders, one dealing with vitreous porcelain insulators of all types and sizes, and the other with refractories for electric fires, coolers, etc.

Siemens Electric Lamps & Supplies, Ltd., 38/9, Upper Thames Street, London, E.C.4.—Priced leaflet and display card on the improved "Silvalux" lamp, and priced folder on "Sieray," "Mellow Light" fluorescent lamps.

Change of Name

The **United Electric Co. (Birmingham), Ltd.,** has changed its name to Birmingham United Lamps, Ltd.

INFORMATION DEPARTMENT

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"VENRECO" porcelain lampholders.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

RADIO COMPONENTS EXHIBITION

Industry's Change of Fortune

THE seventh annual private exhibition of the Radio and Electronic Component Manufacturers' Federation held from Monday until Wednesday of this week at Grosvenor House, London, demonstrated the advances which have been made by British engineers in the design and manufacture of components for the radio and allied electrical industries.

The exhibition was opened by the president, Sir Robert Renwick, who thought that this year's display would prove even more successful than its predecessors. After outlining the scope of the exhibition he referred to the immense field served by the modern electronic component and expressed the feeling that the present time was, in reality, the electronic, rather than the atomic, age.

At the inaugural luncheon Mr. G. R. Strauss, Minister of Supply, said that the exhibition was a "success story." A year ago the radio industry was in a bad way, its leaders were despondent, its workers worried, and the sales were at the lowest point since the war and looked like falling still lower. To-day, however, the industry was very busy and employed nearly 10,000 more people. Television was the most important single cause of this change in the industry's fortune. Last year the monthly output of sets was about 10,000, but this year it was nearly 40,000.

Comprehensive Display

There were 102 exhibitors and 200 categories of exhibits comprising all types of materials, components, valves and test gear for the radio, television, electronic and telecommunication industries, which ranged from thimble-sized valves and miniature components for hearing aids to heavy-duty types for high power transmitters.

It is evident that a great deal of activity is still being devoted to the "miniaturization" of both valves and component parts. For example, Ferranti, Ltd., displayed a range of miniaturized hermetically sealed transformers and chokes which are designed to suit customers' requirements to operate at frequencies from 400 c/s to 2.8 kc/s. Other miniature transformers were shown by Parmeko, Ltd., while concerns such as Partridge Transformers, Ltd., Woden Transformers, Ltd., and A. F. Bulgin and Co., Ltd., displayed a wide range of power transformers. The last-named company also showed a range of sensitive micro-switches, made under licence and by arrangement with the Acro Switch Co., of America, and an automatic flasher for 6V and 12V signal lamps.

Rectifier Exhibits

Examples of a wide range of selenium and copper oxide rectifiers were shown by Salford Electrical Instruments, Ltd., together with selenium barrier layer photo-electric cells, quartz crystal units, "Gecalloy"-cored coils, dust cores and synthetic gramophone needles.

Selenium rectifiers were also shown by Standard Telephones and Cables, Ltd., and among these was a special type developed for use in television receivers. These rectifiers are made up from square discs, the selenium being coated on an aluminium base, and are capable of working at a maximum ambient air temperature of 40 deg C.

In similar vein the metal rectifiers shown by the Westinghouse Brake and Signal Co., Ltd., illustrated the way in which television receiver design can be simplified. The exhibits included rectifiers for e.h.t. supply from sinusoidal and pulse inputs, as sound and vision interference suppressors, and as economy diodes to furnish h.t. boost from line fly back damping.

Apart from a diversity of valves on the stand of the General Electric Co., Ltd., a range of germanium crystal diodes was shown and some of its applications demonstrated. The exhibits of

the Plessey Co., Ltd., consisted of a range of television components, while British Insulated Callender's Cables, Ltd., showed radio frequency cables and paper dielectric and electrolytic capacitors. Other capacitors were shown by A. H. Hunt, Ltd., together with examples of printed circuits made by the "Ellargol" process.

Paper mica, silver mica, ceramic and electrolytic condensers were displayed by the Telegraph Condenser Co., and the Telephone Manufacturing Co. showed precision capacitors and demonstrated the working of "Carpenter" polarized relays. Steatite and Porcelain Products, Ltd., exhibited ceramic insulators, dielectric moulded ceramics for hermetically sealed components and ceramic formers for precision inductors.

No fewer than 377 types of multi-core solders were displayed by Multicore Solders, Ltd., and H. J. Enthoven showed a range of rosin-cored solders and associated products.

As in previous years there was a comprehensive selection of instruments and test gear. The exhibitors in this section included Sangamo Weston, Ltd., the Automatic Coil Winder and Electrical Equipment Co., Ltd., Taylor Electrical Instruments, Ltd., and Dawe Instruments, Ltd.

Picture Telegraphy

Direct Recording Facsimile Apparatus

ALTHOUGH it is less than four years since Muirhead & Co., Ltd., started making picture telegraph equipment more than 300 sets have been delivered up to the present time and over £250,000 has been brought into the country through exports. On Monday of this week, at a private exhibition in London, the company demonstrated the first British direct recording facsimile apparatus which it is manufacturing under the registered trade name "Mufax."

This new picture receiving apparatus, which is primarily intended for newspaper publishers, was shown under operating conditions and its suitability demonstrated not only for monitoring the phototelegraph equipment but also for the actual reception of pictures for reproduction by the ordinary block-making process. Apart from the complete receiver a small monitor is available for use in the wire room, and also a larger model for the use of art editors.

In addition to the picture receivers and monitors using electro-sensitive papers, the company is also making a picture transmitter which, although smaller and lighter than any previous model, produces photographs of the same quality as the standard equipment. The transmitter drum is 66mm in diameter and provides a full-size picture (10.5in by 10in) on an 88mm drum receiver. This instrument measures 21in by 16in by 7in, weighs 50lb, is operated directly from the a.c. mains, and takes pictures 7⅝in by 8in. All the above machines are in production and deliveries will commence toward the end of the year.

Electricity in Durban

Large Electrode Boiler Installations

DURING the past few months the Durban City Council has been restricting the application of its hire-purchase scheme for the purchase of domestic electric appliances. This scheme in the past played a very big part in building up the load, and it will probably be put into full operation again when conditions are favourable. The Council has instructed the city treasurer not to accept any further applications for such loans because of the present unsettled state of the money market.

Durban now has connected to its mains two of the largest electrode steam boiler installations in South Africa. One of them is the 1,250 kW unit belonging to the Stag Brewery in Umgeni Road. It takes supplies from the three-phase 500 V mains with a maximum current per phase of 1,400 A. This boiler will eventually meet all the steam needs of this brewery for such purposes as brewing, sterilizing, pasteurizing and bottling. On test the unit was used for heating vats. The installation has been so efficiently lagged that the room containing it is no warmer than any other part of the brewery.

New "District" Train

LONDON Transport's first post-war train went into service on Monday on the District Line. Improvements include fluorescent lighting throughout and new-type heating. Externally the train resembles the latest pre-war stock, except that its design includes door-fault detector lights to indicate when an air-operated door fails to close completely, a fluorescently lit destination blind and twin electric tail-lamps. The new train, made up of eight cars, is known as "R" stock and is the first of many now being delivered. In all, 143 non-driving motor cars are being constructed and 82 existing trailer cars converted to "R" type driving motor cars.

ELECTRICITY SUPPLY

Addition of 310,000 kW Generating Plant in March

Wythenshawe District Heating Discussions

FROM the generation statistics issued by the Ministry of Fuel and power (see table below) it is noted that March was a busy period for the commissioning of new plant. At the end of the month the total installed capacity was 14,220,000 kW, compared with 13,910,000 kW at the end of February, an increase of 310,000 kW.

In the area of the North of Scotland Hydro-Electric Board the first of four 32,500 kW English Electric turbo-alternators was brought into service early in the month. The main extensions at B.E.A. stations were as follows: Ferrybridge: 45,000 kW English Electric turbo-alternator. West Ham: 180,000 lb/hr John Thompson boiler. Littlebrook "B": 60,000 kW Metropolitan-Vickers set and 265,000 lb/hr International Combustion boiler. Nottingham: 320,000 lb/hr International Combustion boiler. Dunston "B": 50,000 kW C. A. Parsons set. Kingston: 30,000 kW B.T.H. set and 260,000 lb/hr Stirling boiler. Staythorpe: 60,000 kW B.T.H. set and 240,000 lb/hr Babcock & Wilcox boiler.

In the first quarter of the year 14,870 million kWh was generated, the rate of increase (8.9 per cent) comparing with 7.2 per cent in the first three months of 1949.

Yorkshire Area Rebate

The Yorkshire Electricity Board has announced a rebate of 0.2d per kWh to consumers taking supplies under tariffs which bore the 1948-49 surcharge. It will apply to accounts for electricity used during the period commencing with the first meter reading after 1st May. The rebate is designed to refund to consumers the amount by which, in the Yorkshire Area, the total surcharge collected exceeded the rebates already allowed. The number of consumers affected is approximately 800,000.

Cooling Tower Modifications

Alterations by the B.E.A. at Stockport power station are expected to end the nuisance caused by the "drizzle" from the cooling towers. Three methods are to be tried in different parts of the country and the most satisfactory will be adopted on a national basis. That at Stockport consists of controlling the upward flow of air inside the tower, so that globules of water are no longer flung into the atmosphere. The other two methods consist of fitting wooden baffle plates at the top of the tower, but these methods are likely to prove too expensive.

Another Scottish Transmission Scheme

Following the confirmation of the scheme prepared by the North of Scotland Hydro-Electric Board for overhead transmission lines from Aberdeen to Dundee, estimated to cost £372,000, a White Paper was published last week dealing with another project. In this case the constructional scheme confirmed by the Secretary of State provides

	Fuel Consumed Thousand Tons		kWh generated Millions			kWh sent out Millions	Installed capacity (m.c.r.) MW
	Coal	Oil	Steam	Water Power	Total*		
British Electricity Authority ...	2,792	4.2	4,707	38	4,759	4,489	13,842
North of Scotland	22	1.2	32	74	111	109	378
Total for March, 1950	2,814	5.4	4,739	112	4,870	4,598	14,220
Total for March, 1949	2,733	4.8	4,518	123	4,659	4,402	13,257
Increase or decrease, per cent ...	+3.0	+12.5	+4.9	−8.9	+4.5	+4.5	+7.3
Total for Jan.-Mar., 1950	8,598	18.1	14,455	354	14,870	14,051	—
Corresponding total for 1949 ...	8,035	14.2	13,227	377	13,658	12,904	—
Increase or decrease, per cent ...	+7.0	+27.5	+9.3	−6.1	+8.9	+8.9	—

* The total figure includes generation by oil engines, refuse destructors and waste heat plants amounting to 9 million, 0.3 million and 10 million kWh respectively in March, 1950.

for the erection of lines from Tummel Bridge in Perthshire to Inveruglas on the west side of Loch Lomond, constituting an important connecting link in power supplies between the east and west of Scotland. The estimated cost is £498,000. The Amenity Committee has agreed to the route proposed by the Board. Some objections were lodged against the scheme, but these have all been withdrawn following negotiations between the Board and the objectors.

Wythenshawe District Heating

It was stated last week that the Ministries of Health, Fuel and Power, and Works had agreed to meet a deputation of four representatives of the Manchester Corporation's Housing and Wythenshawe Estate Committees to discuss the proposed £5,500,000 district heating scheme. One of the difficulties in the past has related to the price at which the B.E.A. would be willing to purchase the residual electricity from the two generating stations which would be provided under the scheme. Councillor J. E. Fitzsimons, chairman of the Wythenshawe Committee, said that these differences had now been cleared up and a stage had been reached at which every aspect of the scheme could be discussed with the Ministries.

Up to the present about £100,000 has been spent on the scheme. The view is taken that as the project, if proved successful, would be of great benefit to the whole of the country, the Corporation should be guaranteed against loss. It has been estimated that the scheme could be made self-supporting on a weekly charge to householders of 7s 6d per week.

House Installations

Subject to Ministry approval, 350 Council houses at Brigg are to be wired for electricity.

Blaydon-on-Tyne U.D.C. has instructed the surveyor to prepare an estimate of the cost of installing electricity in 246 Council houses at present served by gas.

Scarborough Housing Committee has decided to install electricity in Council houses in Castle Ward if the tenants desire it. An installation charge of 8d a week is to be made (9d for four-bedroomed houses).

S. Rhodesia Fuel Supplies

Power stations in Southern Rhodesia, particularly Bulawayo, have had difficulty in securing adequate supplies of coal to maintain the load, mainly because the railways have not always been able to deliver full requirements on time. At one time Bulawayo had only a two-day reserve of coal. The Rhodesian Government was held responsible for this serious condition; it was said that it seemed to be paying more attention to the needs of other users rather than to the municipalities.

New Belfast Station

The Northern Ireland Ministry of Commerce has asked Belfast Corporation to take preliminary steps regarding plant for a new generating station to be built on the West Twin Island, Belfast Harbour. The station will have an initial capacity of 30,000 kW and will be built in two sections, the first of which is required for service in 1953-54.

Power Cuts in North East

The North Eastern Electricity Consultative Council at its meeting on Monday decided to urge the Electricity Board to take exceptional measures to ensure that electricity cuts in the area next winter shall not be on the same scale as last winter. It was suggested that equipment might be obtained from the Continent if it was not available in this country.

Supplies from N.C.B.

With regard to the supply to Witton Gilbert and Kimblesworth, Durham R.D.C. has been informed that until the question of compensation has been settled with former colliery owners the National Coal Board cannot transfer the network to the Electricity Authority.

Guarantee Required

At a meeting of the Allhallows (Cumberland) Parish Council it was reported that an approach had been made to the North Western Electricity Board regarding the possibility of supplying electricity to certain districts. The Board stated that the expenditure involved was such that a guaranteed minimum revenue of £370 per annum for five years would be required. The Council, however, felt that it could not legally give such a guarantee on behalf of consumers.

Cookery Instruction

To broaden the scope of cookery instruction at Westminster Hotel School electric ranges are to be installed in place of gas ranges at an estimated cost of £5,600.

School Lighting Improvements

The Middlesex Education Committee recommends that the lighting installation at the Dudden Hill School, Willesden, should be improved at an estimated cost of £3,200 and that similar work should be carried out at the Leopold Road School at a cost of £3,150.

ELECTRODEPOSITORS' CONFERENCE

Silver Jubilee Celebration at Eastbourne

THIS year's annual conference of the Electrodepositors' Technical Society marks the twenty-fifth anniversary of the founding of the Society. The meeting at Eastbourne this week (Grand Hotel, 19th to 22nd April) opened with an informal gathering on Wednesday evening and there was a civic reception at the Winter Garden, followed by dancing, on Thursday evening. The official dinner is being held to-night, Friday.

Apart from social and recreational functions the technical sessions have been of two kinds: at one of them well-known personalities have introduced such practical topics of debate as metal cleaning, electrical maintenance in plating shops and education in the electroplating trade; at the other papers have been presented for discussion.

Plating on Aluminium

Among the latter was a short contribution outlining part of the work done for the Food Investigation Organization of the D.S.I.R. on the etching of aluminium for direct plating with other metals. In it Dr. J. M. Bryan (Low Temperature Station for Research in Biochemistry and Biophysics, University of Cambridge and D.S.I.R.) explains that a simple test based on a solution of iodine has made it possible to select from a large number of etching solutions one which is capable of rendering the surface of aluminium sufficiently active (Patent No. 25716/1949) to enable other metals to be plated directly upon it.

The manner in which the metal is washed after etching is important because water reacts with metallic aluminium to form a protective film that may greatly influence plating, particularly if it is done by chemical displacement.

The development of electrolytic polishing was discussed in a paper by Dr. H. E. Zentler-Gordon (Modern Electrolytic Patents and Processes, Ltd.) who indicated that an increasing number of industries are interested in the possibilities of the process. The main criticism is that it cannot replace mechanical polishing in the finishing trade. Until particular qualities of metals become available and special care is taken in rolling and forming operations, this limitation must be accepted. A high polish in the sense of optical trueness and smoothness cannot yet be obtained by electrolytic polishing, but the practical examples quoted in this paper show that this kind of treatment is applicable in certain manufacturing stages; also it will impart a high lustre to intricate shapes and broken-up surfaces which it is practically impossible to polish by any other method. Stainless steels, the author shows, are being treated in this way on a production scale, provided the raw material is suitable.

Mr. P. A. Charlesworth dealt with the commercial electrolytic polishing of stainless steel, and Messrs. T. P. Hoar and S. A. S. Mowatt with the electropolishing of nickel in urea-ammonium chloride melts.

Surface Examination

A simple way of measuring the "surface truth" of metal surfaces and the amount of polishing required was described in a paper by Dr. G. E. Gardam, representing work done for the Design Research Centre for the gold, silver and jewellery industries. The method is visually to examine under standard conditions articles near a lamp box covered with a mesh screen. Estimation of the clarity of the reflected image of a strongly illuminated pattern of light and dark stripes, also the distance between lamp and object at which the stripes can be separately distinguished, can be done so quickly that routine is not interfered with. The result is broadly independent of the curvature of the object examined and can be used with relatively non-reflective surfaces, being a positive check of surface quality.

In a paper by Mr. E. E. Longhurst (which is a portion of a University of London thesis for a Ph.D degree) was an account of a Ministry of Supply investigation of the conditions under which copper-cadmium alloys can be co-deposited from solutions of complex cyanides, which do not contain addition agents such as are employed in normal plating practice. The results suggest preferential deposition of one or more of three intermediate compounds. The author makes tentative proposals about the nature of the complex cyanides present and the reactions occurring in the electrolyte.

Further work on the electrodeposition and properties of speculum, a white bronze containing tin that can be polished to resemble silver, which has been done at the Tin Research Institute for the Ministry of Supply, was outlined in a paper by Mr. P. S. Bennett. His investigation has shown that bright plate may be obtained by adding organic brighteners to the bath, either alone or with a little lead. Extremely close control of the chemical composition of the electrolyte, uniformity of the current density and its distribution over the anode is necessary. Mr. H. P. Rooksby described the X-ray structure of speculum electrodeposits.

The electrodeposition of tin from stannous fluoborate baths and addition agents for the latter were commented upon in a paper by Mr. N. Parkinson (Tin Research Institute). Electrolytes of this kind, which have not been much used except for depositing lead and lead-tin alloys, are now being increasingly investigated because they permit relatively high rates of deposition.

Dr. U. R. Evans spoke of the causes of discontinuities in electrodeposits.

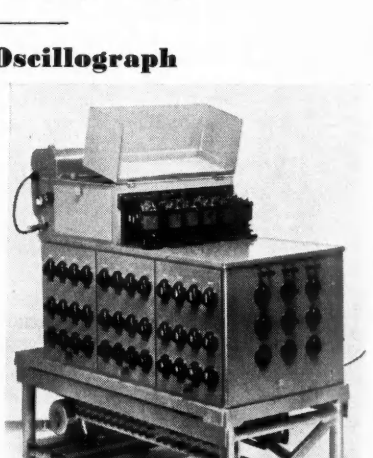
The theory of "surface active" agents employed to improve the cleaning of metals before plating was the subject of a short paper by Mr. R. C. Tarring (Shell Chemicals, Ltd.) who pointed out that many proprietary plating salts contain such "wetting" agents. Their purpose is to promote more intimate contact between plating solutions and metal surfaces.

Mr. G. Schmerling dealt with emulsion cleaning.

A discussion on the interpretation of specifications is to take place to-morrow (Saturday) morning.

The Duddell Oscillograph

IT is now just over 50 years since William du Bois Duddell first demonstrated the oscillograph which he had made and to mark the occasion the Cambridge Instrument Co., Ltd., has issued an interesting monograph on "The Development of the Oscillograph," which also contains some biographical notes on the inventor. This 16-page publication is one of a series that will detail the association of the company with various eminent scientists in the development and manufacture of instruments of a fundamental character for furthering research and increasing industrial instrumentation. The company's latest development in this field is a 12-channel field oscillograph which has been specially made for work on strain and vibration problems. This is a compact outfit which embodies twelve standard Duddell oscillograph elements, each in a separate oil bath and with independent adjusting arrangements.



Cambridge 12-channel oscillograph for carrying out strain and vibration investigations

COOKER HIRE-PURCHASE

Manufacturers Take a Hand

AN unusual form of cooker advertisement appeared in the *Radio Times* of 31st March and it has given rise to some speculation. It offered a standard cooker at 2s a week qualified by the statement: "Easy purchase terms in most districts—some areas slightly less, others more. Apply local Electricity Service Centre."

On the face of it the announcement appeared to be a joint effort of the manufacturers, whose name appeared, and the Electricity Boards but inquiries have made it clear that it originated from the manufacturers themselves; the Boards were merely acquiescent, having been approached for their approval before the advertisement appeared.

Quite naturally those electrical contractors and retailers who aim at selling cookers are somewhat perturbed by what they regard as an encouragement to the Boards to monopolize the cooker business. Their anxiety can be appreciated but it is very doubtful whether the cooker manufacturers' ingenious plan really alters the position which has existed since long before the nationalization of the electricity supply industry.

Direct sales of electric cookers have for many years formed a very small proportion of the total sales—something less than 10 per cent it is believed—and few contractors are in a position to offer hire-purchase terms sufficiently attractive to combat the rush of gas cookers into people's homes.

This is the crux of the matter—the intensive activity of the gas industry. Mr. E. R. Wilkinson, the commercial manager of the British Electricity Authority, said recently that the gas industry was disposing of three or four times as many cookers as the electrical industry. In the meantime the expanded manufacturing facilities of the electric cooker makers are not matched by the existing selling arrangements with the result that cookers are piling up. Popular inclination is towards electric cookers but until quite recently selling policy has been anything but aggressive, largely because of the difficult generating plant situation.

Now the Electricity Boards are coming to a realization that it is their duty to see that everybody who wants an electric cooker should have one and that means evolving hire-purchase terms as close as possible to those extended by the gas industry, and making those terms known. If the manufacturers take a hand in this, with the consent of the Boards, they seem to be engaging in a quite legitimate way of selling their products to keep their factories going.

London Consultative Council

A REPORT on the activities of the London Electricity Consultative Council presented at its quarterly meeting last Friday included the following items:—

District Committees.—Representations on District Committee procedure were considered. The Consultative Council reaffirmed its previous decision that the Press should not be admitted to such meetings. One clause of the District Committee scheme providing that each member of the Council should be a member of the District Committee for the area in which he resided or had his place of business had proved inconvenient and an amendment to the scheme covering this point had been approved by the Minister of Fuel and Power. In addition, to avoid misunderstanding, the clause referring to members "appointed to represent" local authorities had been altered to "nominated by."

Street Lighting.—Following discussions with the London Electricity Board on charges for maintenance and other services in connection with street lighting, the Metropolitan Boroughs' Standing Joint Committee had advised their constituent Councils that the proposed basis was satisfactory, and it was expected that the Outer London Boroughs' Committee would follow a similar course. The Board had also approved a scale of charges for elec-

tricity supplied for street lighting, bollards, etc., under contracts including maintenance services. The Consultative Council decided that the Board should be asked to endeavour to secure a standard form of lighting and light intensity on all main or trunk roads in addition to the standard heights and spacing now in force.

Purchase Tax.—A resolution of the South Eastern Committee recommending that the Council should take every possible step for the removal of all purchase tax on electrical household equipment was noted.

Domestic Tariffs.—After considering a letter from the Board regarding domestic tariff structure, the Council unanimously recommended a two-part system with the standing charge based upon some easily ascertainable factor such as number of rooms, external measurements, or rateable value. The Council also suggested that any changes in the existing tariff structure should not in themselves have the effect of materially increasing the Electricity Board's revenue.

Assisted Wiring.—The Council agreed that the London Electricity Board should be asked to accept the principle of assisted wiring and to consider the reintroduction of the system as soon as the financial position permitted

Area Measuring Equipment

AN electrically operated area measuring machine, which is primarily intended for use in the leather trades, has been developed by Londex, Ltd. This equipment, working on the photo-electric principle, renders the measurement of both small and large skins an extremely simple and rapid process. Essentially it comprises a photo-electric cell mounted above a table with an opalescent glass top which is illuminated from underneath by means of an arrangement of 40 W tungsten filament lamps. The leather to be measured is merely laid on the table and an 18in diameter long-scale instrument on the control panel indicates its area directly in square feet or other units.

The apparatus is operated by the a.c. component of the light source, so that measurements are unaffected by daylight, and in order to permit the use of the equipment after dark a d.c. power pack is incorporated in the control panel for room lighting; it provides 150 W at 230 V d.c. Because of the special arrangement of the photo-cell and the lamps the accuracy of readings is not affected by the position of the article on the table. Apart from this, compensation is made for variations in mains voltage and frequency.

The Londex area measuring machine

North Wales Power

THE North Wales (Hydro-Electricity) Protection Committee has published a booklet in which it sets out the case against the proposed hydro-electric development. In an introduction it is stated that the need today for a much better supply of electricity in rural Wales and on parts of the North Wales coast is admitted by all, but is not the matter in discussion. What is denied by the opponents of the present proposals is that these are, on any proper judgment of the whole case, an allowable way of providing what is needed. The Committee, whose address is at Liverpool, has been constituted by the Standing Committee on National Parks of the Councils for the Preservation of Rural England and Wales; the British Mountaineering Council; the Merseyside Advisory Committee on Open-Air Organizations; and the Birmingham Open-Air Societies' North Wales Committee.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

REPORTS AND DIVIDENDS

The Brush Electrical Engineering Co., Ltd.—In his statement issued with the report and accounts, Sir Ronald Matthews (chairman) says that from 1946 to 1949 the rate of receipt of orders at the Loughborough factory has risen sharply, and to cope with the increased output, the factory has been rearranged and laid out on up-to-date lines. During 1949 manufacturing space for switchgear was doubled, and for transformers was increased by one-third.

Referring to the Ljungstrom turbine, Sir Ronald says that during the year turbines at Sunderland, York, Lincoln and Grimsby have been fitted with the new design of blading under the reconstruction programme. The first of these was installed in April, 1949, and results so far have given the board every reason to believe that the design of the new blading has overcome the troubles and difficulties which were experienced in the past. The directors decided to cease manufacture of the four-wheeled battery electric vehicles, thus freeing capacity for a more remunerative production in other directions.

The Stockport factory of Mirrlees, Bickerton & Day, Ltd., has increased its production by nearly 50 per cent over that of 1948, and 90 per cent of the total output has been exported. The rise in production at the Leeds factory of J. & H. McLaren, Ltd., which began in 1946, has been fully maintained in the past year, and they have a full order book to the end of the current year. The McLaren-Brush 55 kW diesel-electric generating set, designed as an emergency plant to operate during the power cuts, has been installed throughout the country, and exported in large numbers. The factory of Petters, Ltd., at Staines, is now producing to the limit of its capacity, and they have obtained a licence to erect additional buildings. They are now in process of arranging distribution of Petter engines throughout America, where they can be sold at prices competitive with those of American-produced engines of a similar capacity. The group's order book by the end of the year had decreased by 20 per cent as compared with the end of 1948, but the board does not consider that this is unsatisfactory having regard to the changing conditions in world trade. The cause of the shrinkage has been long deliveries, and there is evidence that as they are able to shorten deliveries, further orders are forthcoming at a steady rate. Sales companies have been formed in Canada, America and Belgium, and arrangements for the formation of similar companies in South America, India and the Far East are on the verge of completion. Their company has recently acquired from Associated British Engineering, Ltd., certain shares which the latter company holds in the National Gas & Oil Engine Co., Ltd., with an option to take over the remainder of their holding at cost. This option, if exercised, will give their company more than 50 per cent of the ordinary shares in the National Co.

Switchgear & Cowans, Ltd.—The annual meeting was held on Tuesday last, Mr. H. Burroughes (chairman) presiding. In his circulated statement Mr. Burroughes says the company has a number of new designs which are now being tested to obtain the necessary certificates of performance. Their products are still in great demand by the British Electricity Authority, the National Coal Board and other users, both in this country and abroad, and they expect a further increase in output this year which will absorb the whole of the capacity of their present works. The company has plans for the future which will add further stature to the company.

The Jerusalem Electric & Public Service Corporation, Ltd.—In the course of his speech at the annual meeting held on 12th April Mr. H. G. Balfour (deputy-chairman) said that the deficit for the year ended 31st March, 1949, was due to the abnormal circumstances then existing in Jerusalem. The warfare between Israeli and Arab forces resulted in considerable damage to the company's property, particularly to the overhead network. The power station escaped damage, but fuel oil became difficult to obtain, and for some time the supply of electricity had to be drastically curtailed. Further, the Arab areas of the Corporation's concession were cut off from the power station, and it was not possible to resume supply to these areas during the year. As a result, the number of kWh sold amounted to only 11 million, as compared with over 23 million kWh sold in the previous year.

Operating costs rose steeply during the year, and certain increases in tariffs which were granted by the Israeli Government were not sufficient to meet the increased cost of

production. The preliminary figures for the year ended 31st March last reflected the more settled conditions prevailing and indicated a considerable improvement over the previous year. Damage to the system in the New City had been repaired and some extensions had been completed. A small supply was being given in the Jordan territory from two diesel units and further generating units were in course of shipment.

The National Gas & Oil Engine Co., Ltd., reports a trading profit for the year ended 31st December last of £304,943, as compared with £230,154 for 1948, and a net profit of £238,474 (against £166,265). To this is added £55,416 brought in and £2,832 adjustment in respect of previous periods, making £296,722. Reserve for future taxation receives £99,000, writing off patterns and drawings £58,500, and general reserve £50,000. The ordinary dividend for the year is unchanged at 5 per cent and £43,172 is carried forward.

In his statement issued with the report and accounts Lord Cunliffe says that the policy of reducing the number of types of engines in manufacture has been further pursued. The output in 1949 was 20 per cent greater than that of 1948 and the increased rate of production has been achieved with few additions or replacements of machine tools. The reorganization of the factory which will be implemented during the next two years will result in an increased output on a scale far greater than has been hitherto achieved. It is hoped to have the new building completed by the end of August, which will enable them to move the spare parts department and utilize the bay at present occupied by it in the main buildings for engine assembly.

The West London & Provincial Electric & General Trust, Ltd., reports a gross income for the year ended 31st March last of £49,032, as compared with £44,005 in the preceeding year, and a net profit of £18,961 (against £16,621). General reserve receives £4,000. The ordinary distribution for the year is maintained at 7 per cent by a final payment of 5 per cent. The balance carried forward is £8,554 (£6,496 brought in).

The Sturtevant Engineering Co., Ltd., reports a group profit for 1999 of £442,396, as compared with £306,251 for the previous year, and after providing for taxation a net profit of £214,996 (against £145,601). The interim dividend on increased capital was 5½ per cent, tax free (same), and the final dividend is 11 per cent, tax free (against 11 per cent and a bonus of 5½ per cent). The balance carried forward is £89,067 (against £68,040 brought in).

Enfield Rolling Mills, Ltd., reports consolidated trading profits for 1949 of £626,678, as compared with £503,716 for 1948, and a net profit of £225,058 (against £163,380). Staff pensions receive £15,000, general reserve £100,000, and replacements reserve £50,000. The ordinary dividend for the year is 5 per cent with a bonus of 2½ per cent (unchanged). The balance carried forward is £124,915 (against £97,857 brought in).

Glenfield & Kennedy, Ltd., report a consolidated net profit of £251,585 for 1949, as compared with £230,425 for 1948. The net profit attributable to outside shareholders is £9,322, and the amount retained by subsidiaries £48,746, leaving the net profit of the parent company £193,517 (against £131,254). The sum of £100,000 is transferred to plant replacements and contingencies, and it is proposed to pay a final ordinary dividend of 15 per cent, making 20 per cent for the year (against 20 per cent for nine months). The balance carried forward is £60,633 (against £52,741 brought in). The figures for 1948 cover the results of the parent company and two minor subsidiaries for nine months and three major subsidiaries for a full year.

NEW COMPANIES

Brooks & Bohm (Electrical), Ltd.—Registered 24th March. Capital £3,000. Manufacturers of and dealers in lighting, heating, cooking and electrical equipment of all kinds, etc. Directors: E. Etherington and Grace Etherington. Regd. office: 90, Victoria Street, S.W.1.

Santone Electrical Co. (Leeds), Ltd.—Registered 28th March. Capital £1,000. To acquire the business of electrical engineers and contractors carried on by the Santone Electrical Co. at Leeds. Directors: H. W. Sanders and Mrs. Emily H. Sanders, C. H. Stone and Mrs. Ruth Stone. Regd. office: 4, Oxford Place, Leeds, 1.

R. & R. Radio Co., Ltd.—Registered 28th March. Capital £8,000. To acquire the business of wireless, television, electrical, motor and refrigeration engineers carried on by D. H. Raphael, R. R. Rayner and E. G. Rayner at 75/76, St. Johns Street, Bury St. Edmunds, Suffolk, as R. & R. Radio Co. Directors: D. H. Raphael, R. R. Rayner and E. G. Rayner. Regd. office: 75/76, St. Johns Street, Bury St. Edmunds.

Electrical Development Co. (Chester), Ltd.—Registered 1st April. Capital £500. Subscribers: S. W. Rogers, and Henrietta J. Wileman. Solicitors: Fdk. L. Elsworth, 13, Castle Street, Liverpool.

Sevel Radio, Ltd.—Registered 28th March. Capital £1,000. To acquire the business of radio and electrical manufac-

turers and dealers carried on by A. Eves and C. Lee at 13, Anglesea Road, Woolwich, as Eves Radio Supplies. Directors: C. Lee and A. Eves. Regd. office: 17, Anglesea Road, S.E.18.

Electrafrige, Ltd. — Registered 31st March. Capital £20,000. Manufacturers of and dealers in refrigerators, etc. Directors: G. R. Ashcroft, P. S. Ashcroft, and G. R. Kennerley. Regd. office: 60, Manchester Road, Preston.

Varicol Signs, Ltd.—Registered 5th April. Capital £3,000. Manufacturers of electrical advertising signs, neon signs and display lighting, etc. Directors: L. C. H. Smith, Winifred E. Smith, J. A. Munden, and T. Buckler. Regd. office: 15, Dover Street, Coventry.

Electrical Remote Control Co., Ltd.—Registered 5th April. Capital £100. Electrical and mechanical engineers and contractors, etc. Directors: W. Younge and Iris Younge. Regd. office: 15, Evanston Avenue, Hale End, E.4.

Exhibition Electrical Installations, Ltd.—Registered 3rd April. Capital £1,000. Directors: J. D. Rose, F. C. Slade and R. G. Davison. Regd. office: 6, Bostal House, West Street, Brighton, Sussex.

T. & H. Electrical Service, Ltd.—Registered 1st April. Capital £2,000. Electrical engineers and contractors, radio and television contractors and engineers, etc. Directors: A. F. Todman, J. R. Hammond and C. W. Leech. Regd. office: 776, Barking Road, E.13.

LIQUIDATIONS

R. H. Boyland & Co., Ltd., 153, Seymour Place, London, W.1, electrical engineers.—The first meeting of creditors was held on 12th April at the offices of the Board of Trade, Columbia House, Aldwych, London, W.C.2. A resolution was passed for the appointment of Mr. D. Morgan, accountant, of 100, Park Street, Grosvenor Square, W., as liquidator, together with a committee of inspection.

Ward Electrical Engineering Co., Ltd., 155, Wardour Street, London, W.1, electrical engineers and contractors.—The first meeting of creditors was held recently at the offices of the Board of Trade, Columbia House, Aldwych, London, W.C.2. A resolution was passed for the appointment of Mr. A. E. Attwood, accountant, 20-21, Lawrence Lane, London, E.C.2, as liquidator of the company, together with a committee of inspection.

Marlowe Products, Ltd.—Winding-up voluntarily. Liquidator, Mr. T. D. Walker, 23, Blomfield Street, London, E.C.2. Particulars of claims to the liquidator by 23rd May. This notice is formal. All creditors have been or will be paid in full.

C.E.I. (Radio & Television), Ltd.—Winding up voluntarily. Liquidator, Mr. N. R. Oldaker, 133-136, High Holborn, London, W.C.1.

Raymax Electrical Co., Ltd.—Creditors' voluntary winding-up. Meetings 13th May at the offices of Gray, Stainforth & Co., King William Street House, Arthur Street, London, E.C.4, to receive an account of the winding-up by the liquidator, Mr. J. G. Birkett.

Drake & Gorham Electrolumination, Ltd.—Members' voluntary liquidation. Final meeting of members on 10th May, at the offices of Electrolumination, Ltd., Layton's Buildings, Borough High Street, London, S.E.1, to receive an account of the winding-up by the liquidator, Mr. F. E. Metters.

BANKRUPTCIES

J. G. Sandell, 20, Hart Road, Dorking, and Ansell Road, Dorking.—Order made 3rd March, 1950, granting discharge subject to bankrupt's consenting to judgment being entered against him for the sum of £20.

L. M. Watts, Cucumber Lane, Brundall, Norfolk, radio and electrical engineer.—Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich, Official Receiver, released 5th April, 1950.

H. J. A. Wade and **C. L. Wade,** residing and carrying on business as C. & H. Wade & Co., at 40, Dulwich Road, Herne Hill, London, S.E.24, and lately carrying on business at 68, Water Lane, Brixton, London, S.W.2, electrical engineers and contractors.—Receiving order made 4th April on debtors' own petition.

F. McMahon, 3, Exeter Street, Leeds, and formerly carrying on business at Camden House Chambers, Leeds, 2, electrician.—Receiving order made 30th March on debtor's own petition.

J. F. Gannon, carrying on business at 11, Barclay Street, Leeds, electrical engineer.—Public examination 20th June at the Court House, Albion Place, Leeds.

I. F. Moore, residing and carrying on business at 3, Club Street, Kettering, electrical contractor.—Trustee, Mr. A. T. Cheek, 6, The Parade, Northampton, Official Receiver, released 31st March, 1950.

G. Maddison, carrying on business at Church Street, Kidderminster, electrician.—Last day for receiving proofs for dividend, 26th April. Trustee, Mr. R. K. Clark, Somerset House, 37, Temple Street, Birmingham, 2, Official Receiver.

FINANCIAL SECTION

STOCKS and SHARES

THE effect of the Budget had been anticipated in the Stock Exchange as likely to prove somewhat colourless. Optimism and pessimism alike have been quiescent, so far as the Budget is concerned, during the present year, but it was something of a surprise to find British Government and other gilt-edged securities going sharply ahead last week on the eve of the Budget's introduction. British Electricity and British Transport stocks advanced with the rest of the group, and this had a favourable influence upon industrial ordinary shares. Into these a good deal of money seemed to be flowing, not only for account of institutional investors, but of private capitalists as well, the result being reflected, of course, in a general firmness of prices.

B.E.A. Stocks

As noted above, prices of Government securities took a distinct turn for the better during the week preceding the Budget. Credit for the improvement was given less to Budget anticipations than to the idea that the market is being prepared for a new loan. This theory, coupled with the prospective capital requirements of the B.E.A., confirmed the impression, mentioned here last week, of the latter being a probable and substantial borrower. Rumour was specific enough to mention £150,000,000 as the likely amount involved.

Changes on the Week

Hoover shares at 38s 3d and Automatic Telephone at 56s 3d are both $\frac{1}{8}$ higher. Johnsons & Phillips, 61s 3d, and Cossor, 8s 6d, are 6d to the good. Scottish Cables rose 1s to 23s. E.M.I. shares, after being down to 19s 9d, suddenly recovered to 22s 3d. The change-over is attributed to a renewal of buying from America, the reason for which has not yet transpired. C. A. Parsons at 65s are up another 2s 6d. On the other side of the sheet, the falls are insignificant. A slightly easier tendency left Lucas 27s, De La Rue 19s 6d, Brush Electrical 6s, and British Aluminium 40s. Perak River Hydro-Electrics at 8s are a few pence lower.

Miscellaneous Matters

Television shares showed indifference to the reports connected with the broadcasting of sporting events. Pye deferred at 31s 9d are near the highest price of the year. Indian electricity stocks have responded well to the outcome of the Delhi Conference. Compared with prices of a month ago, Calcutta Electrics are 23s against 20s 6d, Cawnpore Electrics 50s against 37s 6d, and Delhi Electrics 55s against 52s 6d. Wall Street has surprised some of its keenest supporters by raising industrial share prices to the best points in nearly twenty years. British investors still have to pay a 15 per cent premium over the local price in order to acquire a dollar security. The recent strength of Canadian Marconi shares adds interest to the published net profit for 1949, which, at $26,600, represents a considerable improvement upon the loss in the previous year of $389,000.

Cable & Wireless Alternatives

Stockholders in Cable & Wireless (Holding) have another week in which to exercise the various options open to them under the amended scheme; the company's forms must be in by 28th April. So far as the preference is concerned, brokers report that holders are showing a predilection for the option to take (for each £100 stock) the £40 Savings Bonds 3 per cent 1960/70, plus £65 cash, the latter being used to apply for the new 4 per cent loan stock. This loan stock is expected to prove popular enough to command a premium, when dealings begin, over the price of 96 at which it is being offered. As matters stand, holders taking this course should be able to realize not less than £103 per £100 existing stock; or they would stand possessed of two good securities as continuing investments.

Ordinary Stockholders

Holders of each £100 Cable & Wireless ordinary stock can take, under the scheme, £125 Savings Bonds 3 per cent 1965/75 (without any option) plus either, (1) £180 new ordinary stock, or (2) all or part of this in the 3 per cent 3½-year loan stock, to be issued at par. Those intending to liquidate their interests appear to be going for the second alternative, which, with the Savings Bonds, should safely realize about £295 per £100 existing stock (currently quoted at 282).

The new ordinary stock appeals to those with confidence in the future of the investment trust business, which the company will continue to operate. It is a condition for the success of the scheme that stockholders of either class shall apply for a combined total of not less than £4.95 million of the ordinary stock. The present ordinary stock, at 282, is up four points since a week ago: the preference keeps firm at 101.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

13868. Submarine Signal Co.—Systems for measuring distances by the use of electro-magnetic waves. 19th July, 1944. (638272.)

15862. Standard Telephones & Cables, Ltd., Strong, C. E., and Heaton-Armstrong, L. J.—Radio navigational systems. 31st May, 1945. (638342.)

1945

12886. Simplex Engineering Co.—Energy translating apparatus such as radial reciprocating pumps and the like. 23rd May, 1945. (638344.)

20074. Standard Telephones & Cables, Ltd.—Multichannel communicating systems. 3rd August, 1945. (638345.)

20075. Standard Telephones & Cables, Ltd.—Receiving systems for modulated electric pulses. 3rd August, 1945. (638346.)

29655. Keynes, R. D., Parker, E., and Wright, C. S. —Radar and like systems for detecting and locating objects. 21st July, 1947. (638274.)

29950. Kellermann, Z. F., and Partos, P.—Hearing aids for deaf persons. 9th December, 1946. (638484.)

31341. Alfa-Laval Co., Ltd., and Clark, T. L.—Electrically conductive rubber hose or the like. 21st November, 1946. (638486.)

31342. Alfa-Laval Co., Ltd., and Clark, T. L.—Electrically controlled mechanical milking installations. 23rd December, 1946. (638487.)

1946

7889. Marconi's Wireless Telegraph Co., Ltd.—Electric pulse generator or delay circuit arrangements. 13th March, 1946. (638489.)

21681. British Thomson-Houston Co., Ltd.—Gas turbine power plants. 19th July, 1946. (638494.)

29042. Sperry Gyroscope Co., Inc.—Generation of pulses of high-frequency energy. 28th September, 1946. (638354.)

33907. Allmanna Svenska Elektriska Aktiebolaget.—Rectifier with transductor for voltage regulation. 15th November, 1946. (638276.)

35853. Lovell, A. J.—Electrical connector blocks and junction boxes. 29th November, 1947. (Cognate application 19089, 17th July, 1947.) (638359.)

37257. Black, D. H., and Bailey, A. E.—Radar systems. 26th January, 1948. (638278.)

37811. British Thomson-Houston Co., Ltd.—Electric control systems for dynamo-electric machines. 24th December, 1946. (638506.)

1947

946. Eisner, H.—Electrical alarm systems. 10th January, 1947. (638280.)

1408. Marconi's Wireless Telegraph Co., Ltd., and Mortley, W. S.—Electrical voltage or current controlling apparatus. 11th December, 1947. (638281.)

3429. Bendix Aviation Corporation.—Electromagnetically actuated reciprocating pumps. 5th February, 1947. (638362.)

3914. White, E. L. C.—Electrical integrating circuit-arrangements. 27th January, 1948. (638509.)

5024. Bradfield, G., and Pulsford, E. W.—Electromechanical transducers. 12th March, 1948. (638285.)

5886. Brush Development Co.—Magnetic recording and reproducing. 28th February, 1947. (638288.)

6609. Blaw-Knox Co.—Electric immersion heaters. 10th March, 1947. (638512.)

6995. Kolber, J.—Radio tube container. 13th March, 1947. (638289.)

7720. Standard Telephones & Cables, Ltd., and Earp, C. W.—Radio direction finders. 19th March, 1948. (638292.)

10448. Marconi's Wireless Telegraph Co., Ltd., and Watt, J.—Echo sounders and like sub-aqueous pressure wave apparatus. 22nd December, 1947. (638515.)

10586/7. Johnson, W. A.—Radio aerial systems and particularly directive aerial systems. 9th August, 1948. (638295/6.)

10628. Marconi's Wireless Telegraph Co., Ltd., and Stokes, V. O.—Directional radio systems. 12th December, 1947. (638297.)

11902. Electronic Tubes, Ltd., and Moss, H.—Cathode-ray tubes. 15th April, 1948. (638366.)

13100. Standard Telephones & Cables, Ltd., and Kelly, R.—Regulators for electric power supply systems. 14th May, 1948. (638505.)

13410. Radio Corporation of America. — Radio receivers capable of selectively receiving angle modulated or amplitude modulated carrier waves and detector circuits for use therein. 19th May, 1947. (638423.)

13559. British Thomson-Houston Co., Ltd.—Methods of and apparatus for frequency modulation. 20th May, 1947. (638368.)

14429. Cossor Radar, Ltd., and Levin, A.—Writing telegraph systems. 24th May, 1948. (638425.)

14992. Standard Telephones & Cables, Ltd.—Multichannel communicating system. 6th June, 1947. (638371.)

15004. Standard Telephones & Cables, Ltd., and Wright, E. S.—Adjustment of vibration frequency of piezo-electric crystals. 4th June, 1948. (638304.)

16596. Udylite Corporation.—Electrodeposition of metals or alloys. 24th June, 1947. (638307.)

16867. Alkaline Batteries, Ltd., and Payne, J. E.—Charging racks for secondary batteries. 14th June, 1948. (638518.)

17010. Blaw-Knox Co.—Electric immersion heaters. 27th June, 1947. (638519.)

17478. British Thomson-Houston Co., Ltd.—Phase shifting circuits. 2nd July, 1947. (638432.)

17860. Parsonage, S. H.—Electrical resistance heating element. 7th July, 1948. (638433.)

18229. Bull, C. S., and Atherton, A. H.—Electron multipliers. 18th June, 1948. (638521.)

18282. Sunbeam Corporation. — Automatic bread toaster. 10th July, 1947. (638201.)

19264. Western Electric Co., Inc.—Resistance units and methods of making them. 18th July, 1947. (638436.)

19368. Metcalf, J. H.—Electric heaters. 19th July, 1948. (638203.)

19542. Hazeltine Corporation. — Super-regenerative wave-signal receiver. 21st July, 1947. (638204.)

22578. Allmanna Svenska Elektriska Aktiebolaget.—Transductor with internal self-magnetization and with additional self-magnetization. 14th August, 1947. (638381.)

23311. Western Electric Co., Inc.—Magnetic materials and devices. 22nd August, 1947. (638210.)

23724. British Thomson-Houston Co., Ltd.—Methods of preparing organopolysiloxanes. 27th August, 1947. (638313.)

24850. Standard Telephones & Cables, Ltd.—Manual telephone exchange systems. 10th September, 1947. (638213.)

25052. Plessey Co., Ltd., Jarvis, P. J., and Drinkwater, F. C.—Separators for separating liquid particles from air or gas. 10th August, 1948. (638315.)

25721. General Electric Co., Ltd., and Ross, W. R.—Electromagnetic step-by-step switches. 2nd September, 1948. (638384.)

25838. British Thomson-Houston Co., Ltd.—Liquid polysiloxane oils. 23rd September, 1947. (638317.)
25928. Standard Telephones & Cables, Ltd., and Secker, B.—Arrangements for comparing two alternating voltages. 17th September, 1948. (638318.)
27479. Electro Methods, Ltd., and Butcher, F. E.—Electric control arrangements employing saturable reactors. 12th November, 1948. (638319.)
27644. British Thomson-Houston Co., Ltd.—Magnetic brakes. 15th October, 1947. (638220.)
29108. Cinema-Television, Ltd., and Jesty, L. C.—Apparatus for recording television or like pictures on kinematograph film. 30th September, 1948. (638443.)
30289. Westinghouse Electric International Co.—Electrostatic precipitators. 14th November, 1947. (638227.)
31226. Philips Electrical, Ltd.—Manufacture of metal-glass seals comprising an alloy component. 25th November, 1947. (638326.)
32080. Maschinenfabrik Oerlikon.—Control system for squirrel cage induction motors. 4th December, 1947. (638446.)
33417. Scholes & Co., Ltd., G. H., Pearce, F. J., and Pearce, G. S.—Electric plug-and-socket couplings. 11th December. 1948. (638450.)
33585. Vrbecky, F.—Electric cooker. 19th December, 1947. (638235.)

1948

711. English Electric Co., Ltd., and Hughes, J. O. P.—Parallelogram link drives. 7th January, 1949. (638240.)
4084. Ericsson Telephones, Ltd., and Mitchell, J. H.—Magnetically operated devices. 11th February, 1949. (638462.)
4344. Standard Telephones & Cables, Ltd.—Carrier wave communication systems employing frequency modulation. 13th February, 1948. (Cognate application 4345, 20th March, 1947.) (638336.)
6438. Philips Electrical, Ltd.—Positive feed-back circuit-arrangements. 1st March. 1948. (638464.)
7331. Allmanna Svenska Elektriska Aktiebolaget.—Method and means for magnetic separation. 10th March, 1948. (638466.)
7700. Chamberlain, J.—Selenium dry-plate rectifiers. 13th March, 1948. (638401.)
9008. Soc. Française Radio-Electrique.—Detectors and discriminators for amplitude limited frequency modulated waves. 30th March, 1948. (638249.)
10771. Philips Electrical, Ltd.—Electrical apparatus, more particularly radio receivers. 19th April, 1948. (638252.)
10859. Westinghouse Electric International Co.—X-ray apparatus for measuring the thickness of material. 20th April, 1948. (Cognate application 10860, 27th September, 1947.) (638253.)
11108. British Thomson-Houston Co., Ltd., Watt, I. M., and Milner, C. J.—Protection of electron-discharge devices. 5th May, 1949. (638545.)
11132. Thompson, F. H.—Electric tumbler switches. 6th April, 1949. (638254.)
11363. Scadeng, G. W., and Willmott, E.—Light transmitting apparatus. 11th August, 1948. (638404.)
17242. Ekco-Ensign Electric, Ltd., and Hunt, J. R.—Electric lamp sockets. 24th June, 1949. (638261.)
17366. Sanders (Electronics), Ltd., W. H., and Hayward, W. H. T.—Furnaces. 28th July, 1949. (638267.)
32112. Scholes & Co., Ltd., G. H., Pearce, F. J., and Pearce, G. S.—Electric plug-and-socket couplings. 11th December, 1948. (Divided out of 638450.) (638479.)

Brighton Fountain Restored

FROM a decorative control kiosk in the Victoria Gardens, Brighton, the Mayor (Ald. E. Marsh) recently switched on the "Mazda" electric fountain, one of the town's pre-war attractions, which has been restored through the assistance of the British Thomson-Houston Co., Ltd., on whose behalf Sir Felix Pole originally presented the fountain to the Corporation in 1931.

The restored "Mazda" fountain at Brighton

The fountain has thirty projectors, each fitted with a 1,000 W "Mazda" lamp, in the upper basin, to light the jets and sprays of water. The projectors are arranged in five groups, and each group is fitted with glasses of a particular colour, enabling automatic switching to provide a wide variety of effects whilst the fountain is playing. The spectacle is made more impressive by automatic control of the water pressure which raises or lowers the jets and brings them into operation separately or in combination. There is also a bank of "Mazda" tungsten filament lamps round and underneath the upper rim of the fountain which illuminate the cascade of water overflowing from the upper basin.

I.H.V.E. Premium

THE Institution of Heating and Ventilating Engineers has decided that the Napier Shaw Premium for 1951 (value £25) will be awarded for the best paper on some aspect of air conditioning, or on a subject closely allied thereto, submitted in an open competition. The closing date will be 31st December, 1950. Copies of the conditions may be obtained from the secretary of the Institution, 75, Eaton Place, S.W.1.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.

Altrincham.—28th April. Corporation. Street lighting installation Stamford New Road. (See 14th April issue.)

Australia.—NEW SOUTH WALES.—22nd May. Department of Public Works. Ten 2,500 kVA and seven 5,000 kVA transformers. (See this issue.)

BRISBANE.—9th June. City Council. 33 kV underground and submarine cable, multi-core underground and submarine pilot cable. (C.R.E. (I.B.) 47945/50. Ten/1123.)*

Belfast.—12th May. Electricity Department. Transformers and fire fighting equipment. (See this issue.)

Edinburgh.—17th May. North of Scotland Hydro-Electric Board. Construction of approximately 250 miles of wood pole overhead distribution lines in the Island of Skye. (See 14th April issue.)

Hitchin.—1st May. U.D.C. Electrical installations in twenty-eight houses. (See this issue.)

Lincolnshire.—13th May. County Council. Electrical work at Stubton Hall, near Newark. (See this issue.)

Pakistan.—1st May. Director of Supplies (Engineering), Department of Supply and Development. Switchgear, transformers and line equipment for the Dargai Hydro-Electric Scheme. (C.R.E. (I.B.) 47419/50. Ten/1119A.)*

South Africa.—DURBAN.—23rd June. City Council. E.h.v. switchgear for three substations. (C.R.E. (I.B.) 48932/50. Ten/1161.)*

Tangiers.—25th May. Telefonica de Tangier S.A. Telephone receivers. (C.R.E. (I.B.) 49369/50. Ten/1172.)*

Uruguay.—MONTEVIDEO.—5th May. Administracion Nacional de Combustibles Alcohol y Portland. Electrical equipment, including bells, sockets, plugs, automatic switches, lighting columns, lamps, night watch control instruments, and alarm posts. (C.R.E. (I.B.) 48810/50. Ten/1165.)*

ORDERS PLACED

Barrow-in-Furness.—Re-wiring electrical installation at Technical College (£794).—C. A. Eisner & Sons, Grange-over-Sands.

Berwick.—Town Council. Internal wiring of 200 Council houses.—Radel Electric Co.

Carlisle.—Housing Development Committee. Electrical installations in 44 houses (£1,343).—Robert Batey & Co.

Durham.—County Education Committee. Electrical installations at school buildings.—Seaham Harbour County (£410).—North of England Engineering and Electrical Co., Ltd., Ferryhill. Swalwell County (£1,027).—T. Mitchelson (Electrical), Ltd., Gateshead. Benfieldside County (£394).—Gray Brothers (Newcastle), Ltd.

Great Yarmouth.—Corporation. Electrical installations in houses on the Magdalen College estate (£2,089).—Yarmouth Electrical Service.

Newcastle-on-Tyne.—City Council. Six months' maintenance work on electrical installations at Council houses (£240).—Bernard Berrie.

Ramsgate. — Corporation. Electric street lighting on Newington housing estate (£4,598).—South Eastern Electricity Board.

Wallasey.—Corporation Estates and Development Committee. Re-wiring of electrical installation and provision of emergency lighting in connection with reinstatement of Civic Hall (£626).—A. E. Chesters, Ltd.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Addition of third storey to main building of Robert Gordon's Technical College; J. A. O. Allan, Ross and Allan, architects, 10, Bon Accord Square.

Aldridge (Staffs.).—Houses (30) for U.D.C.; H. S. Onions, surveyor.

Ashington.—Six-storey technical college for Northumberland C.C. (£500,000); county architect, County Hall, Newcastle-on-Tyne.

Atherton (Lancs.).—Dwellings (46), Hag Fold site; J. C. Prestwich and Sons, architects to U.D.C., Bradshawgate Chambers, Leigh.

Belper (Derby.).—Houses (56), Crich, and 86 at Kilburn site, for R.D.C.; J. Laycock, surveyor.

Bexley.—Flats and houses (74), Royal Park estate; borough engineer.

Blackburn.—Adaptation of "West Bank," Preston New Road, as hostel for aged; W. Pickstone, borough engineer.

Bolton.—Maisonettes (84), Maldwyn Avenue: borough engineer.

Bourne (Lincs.).—Houses (46) for U.D.C.; Foster & Sons, Ltd., Grantham.

Burnham-on-Sea.—Houses (84), Highbridge Road; U.D.C. surveyor.

Burnley.—Fire station and police headquarters; C. V. Thornley, town clerk.

Caernarvon.—Houses (150); borough surveyor.

Chelmsford.—Houses (198), Chignall estate; John Laing & Son, Ltd., Bunns Lane, N.W.7.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

Cheltenham.—Houses (70), Arle & Hesters Way estate; borough surveyor.

Chester.—Offices and laboratories for Associated Lead Manufacturers, Ltd. (£64,700); R. Costain and Sons, builders, Barlows Lane, Liverpool.

Chipping Warden (Northants).—Conversion of R.A.F. hospital into primary school; Holland & Marks, Ltd., New Street, Daventry.

Congleton.—Houses (30), Parson Street site; C. Brown, borough engineer, Town Hall.

Coventry.—Factory reconstruction, for Singer Motors, Ltd.; A. Matts and Sons, builders, Vecqueray Street.

Crosby.—Houses (132) and 8 flats, Little Crosby; R. J. Barton & Sons, Ltd., Ainsdale, Southport.

Dagenham.—Factory extensions, Wantz Road; Waterlow and Sons, Ltd., 26, Great Winchester Street, London, E.C.2.

Dartford.—Factory, Princes Road; Vitretex (England), Ltd., 44, Seymour Place, W.1.

Denbighshire.—Fire stations, Wrexham and Lanfyllin; G. D. Wiles, county architect, Grove Park, Wrexham.

Eastcote.—Junior and infants' school (£99,320) for Middlesex E.C.; county architect, 10, Great George Street, S.W.1.

Essex.—Schools at Aveley, West Ockendon; Orsett, Terrells Heath and Hainault L.C.C. estate; H. Conolly, county architect, County Hall, Chelmsford.

Exeter.—Tannery and leather drying factory, Marsh Barton Road, for Tremletts, Ltd., Westgate Tannery; C. A. Hayes and Sons, builders, Stork House, Hotwells, Bristol.

Showrooms and stores, High Street; Marks & Spencer, Ltd., 72, Baker Street, W.1.

Filey.—Houses (23), Muston Road, for U.D.C.; F. Vaux, architect, 31, Quay Road, Bridlington.

Flixton (Lancs.).—Secondary modern school (£149,286); G. Noel Hill, county architect, County Offices, Preston.

Glasgow.—Works extensions; Fairfied Shipbuilding & Engineering Co., Ltd., Govan.

Hanley (Staffs.).—Rebuilding of Theatre Royal for Potteries Theatres, Ltd.; G. L. Greaves, architect, 33, Albion Street.

Hebburn-on-Tyne.—Workshop block for new Mid-Tyne Technical School; county architect, Court Lane, Durham.

Holyhead.—Houses (22), at London Road No. 2 site, for U.D.C.; H. Edwards & Sons, Bryngwran, Holyhead.

Hove.—Junior mixed school for East Sussex C.C.; J. Catchpole, county architect, Lewes.

Hull.—Preliminary training school at Western General Hospital, Anlaby Road, for Leeds Regional Hospital Board; architect to the Board, 29/31, Eastgate, Leeds, 2.

Kettering.—Houses (96), Stamford Road site; borough engineer, 3, Gold Street.

Kirkcaldy.—Flats (36), Winifred Crescent; William Williamson & Hubbard, architects, Royal Bank Buildings.

Leatherhead.—County secondary school; county architect, Kingston-on-Thames.

Liverpool.—Factory, Brookfield Drive, Fazakerley; J. & E. Aspinall, Ltd., Signal Works Road.

Houses (78), Greenhill Road, Allerton, and 132 at Walsingham Road; city architect.

London.—FULHAM.—Twin operating theatres at St. Stephens Hospital; South-West Metropolitan Regional Hospital Board, 11a, Portland Place, W.1.

Mansfield.—Houses (100), Ladybrook estate; borough surveyor.

Factory building for Boneham & Turner, Ltd., Nottingham Road; R. Moore & Son, builders, Spencer Street.

Newcastle-on-Tyne.—Houses (158), Montague estate; city architect, 18, Cloth Market.

Church hall, West Road, for the Benwell Grove Methodist Church; M. A. Mackenzie, architect, 1, Eldon Square.

Newport (Mon.).—Alterations and additions to Prince of Wales Orthopædic Hospital for Ministry of Pensions; Taylor Woodrow Construction, Ltd., Ruislip Road, Southall.

Newport (Salop).—Dwellings (36), Long Meadow estate, for U.D.C.; William Sharratt, Ltd., 23, Church Land, Wolverhampton.

North Kesteven.—Houses (38); J. Chadwick, R.D.C. surveyor, 31, Clasketgate, Lincoln.

Norwich.—Flats (52) and dwellings, Heigham Grove and Heigham Street; city architect.

Northampton.—Showrooms, offices and stores, Gold Street and Horseshoe Street; A. Bell & Co., Ltd., Kingswell Works.

Plymouth.—Primary school, Ernesettle No. 1 site; city architect.

Redditch. — Secondary modern school (£160,000) for Worcestershire C.C.; Richard Sheppard & Partners, architects, 16, Bedford Place, W.C.1.

Salford.—Two day nurseries, Bradshaw Street and Hayfield Terrace; city engineer, Town Hall.

Salop.—County primary school, Madeley; A. G. Chant, county architect.

Shardlow (Derbyshire).—Houses (34) for R.D.C.; Pearman & Wade, Ltd., Shardlow.

Sheffield.—County primary school, Greenhill; Hill & Roberts, Parsonage Street.

Smethwick.—Houses (175), Brandhall Road and Bleakhouse Road; borough engineer.

Works extensions; Metals & Alloys (Birmingham), Ltd., Forge Lane, Minworth.

Stafford.—Additional wards at the General Infirmary (£42,000); Birmingham Regional Hospital Board, 10, Augustus Road, Birmingham.

Stalybridge.—Additional block of houses or flats at Stocks Lane estate; Howard & Benson, architects, 88, Mosley Street, Manchester.

Wednesbury.—Works extensions; William Mills, Ltd., Friar Park Road.

West Hartlepool.—Restaurant, Seaton Carew, to commemorate Festival of Britain (£25,000); S. M. Richmond, borough architect, Municipal Buildings.

Weymouth.—Extensions to Weymouth & District Hospital; L. Magnus Austin, architect, 51, Towngate Street, Poole.

Wigston Magna (Leics.).—Secondary school for C.C.; J. E. Blackwall, Grey Friars, Leicester.